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THE AUTOMOBILE

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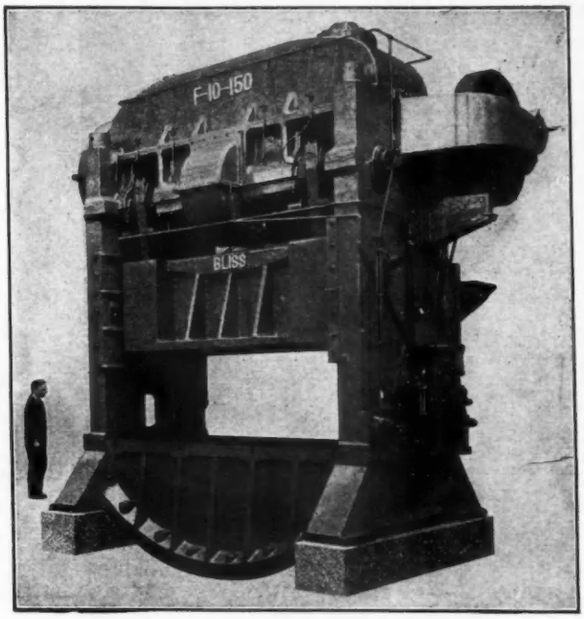

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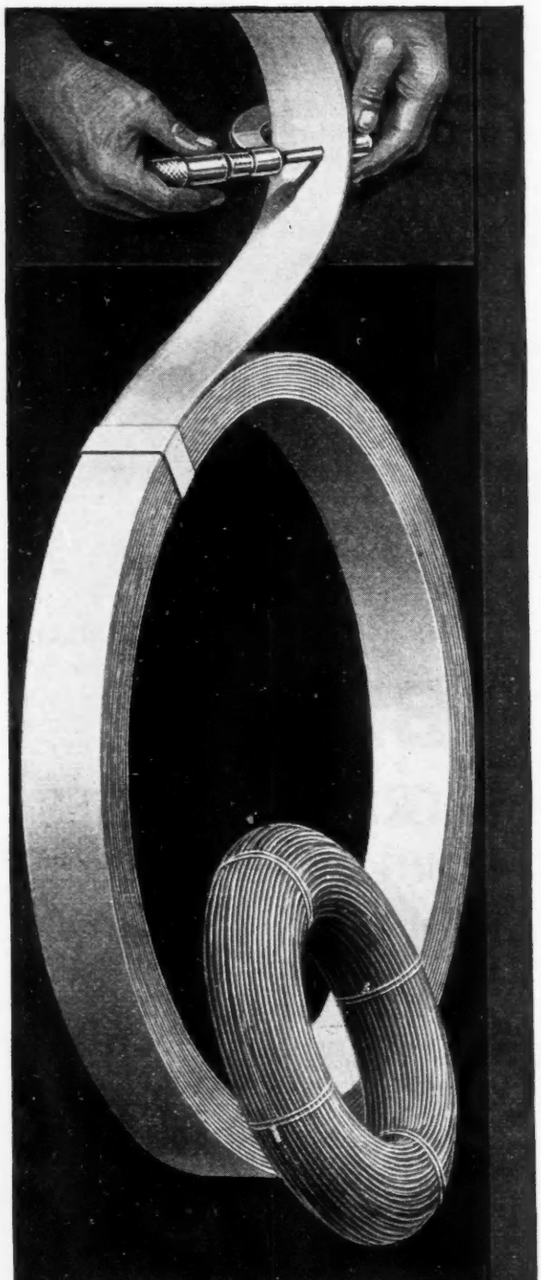

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AUTOMOTIVE INDUSTRIES

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Second-Half Headaches

The severe and needless clean-up losses to factories and dealers alike can be avoided by gaging production to a market that is seldom as large as expected

by Don Blanchard
Editor, Automobile Trade Journal

ONE of the important things, it is worth repeating at this time, that factories can do in this year of sub-normal sales to make the lot of their dealers a happier one and at the same time save themselves millions is to regulate production so that the drastic clean-ups which have characterized the fourth quarter of every recent year will be avoided. Overestimating the second half market has become a habit, and the resulting surpluses have been sold with profit to no one.

Although the second quarter is not yet ended, if drastic four-quarter clean-ups are to be avoided this year, steps must be taken within the next 60 days to prevent them. After that it will be too late, because plans will have been laid and commitments made for fourth-quarter production.

Serious clean-up losses can be avoided if factories will fix Nov. 1 now as the tentative date for the introduction of 1933 models and set production schedules accordingly. Then if stocks of 1932 cars are not liquidated as rapidly as anticipated, the new model announcement date can be moved along until the clean-up can be completed in an orderly manner. By using Nov. 1 as a tentative announcement date, a period of about nine weeks is provided before the New York show, which should be long enough to permit orderly disposal of remaining 1932 models if production schedules are established originally on a reasonable basis.

Clean-ups cost factories money. They cost dealers

(*Turn to page 887, please*)

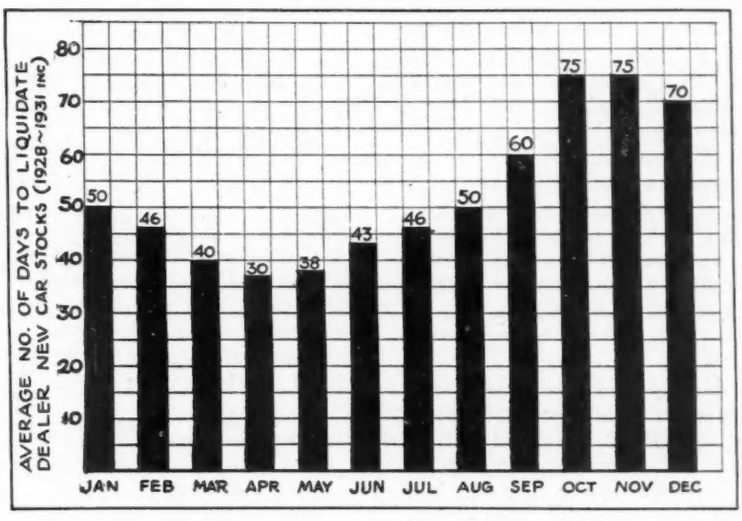
November, December and January are the three poorest months of the year for new car sales, while the April-June quarter is the best selling season of the year.

No wonder drastic clean-ups have been necessary every fall to clear the way for new models!

No wonder dealer used car losses per new car sold have doubled, tripled and even quadrupled during these clean-ups.

During the last four years the average stock of new cars in dealers' hands has been the equivalent of a 75-day supply on both Oct. 1 and Nov. 1, against an average supply of 30 days on April 1.

Year after year the industry has overestimated the second-half market, as evidenced by this chart, which shows, for the last four years, the average number of days it has taken dealers to liquidate new cars in stock on the first of each month.



Dealer stocks of new cars have been averaging two and a half times as large on November 1 as on April 1, when measured in terms of days required to liquidate.

Seven Divisions of S. A. E. Standards

SEVEN divisions of the S. A. E. Standards Committee made reports for the summer meeting of the Society at White Sulphur Springs, W. Va. Brief summaries of the proposals made by these divisions are given below. For the most part the recommendations were adopted as made, but the thrust-bearing and lock-washer recommendations of the Ball and Roller Bearing Division were referred back to the division and slight modifications were made in the recommendations of the Gasoline Engine Division regarding piston rings, and the Parts and Fittings Division regarding ball studs. In accordance with the recommendation of the Parts and Fittings Division, it was decided to cancel the "recommended practices" for lubricator cups and carburetor throttle levers.

THE Aircraft Division reported that the specifications for aircraft instrument cases and mountings which were adopted as a recommended practice in June, 1931, had been intended by it for adoption as an S.A.E. standard, and it requested that the change from a recommended practice to a standard be effected now.

A new revised standard for thrust bearings of the steering-knuckle type was proposed by the Ball and Roller Bearings Division. It includes two sets of tolerances on the bores of the races, one set being intended for designs where the same bore is used for both races and where one race is fairly loose on the knuckle pin; the other for designs in which one race is fairly snug on the knuckle pin and the other quite loose, to provide a self-aligning feature.

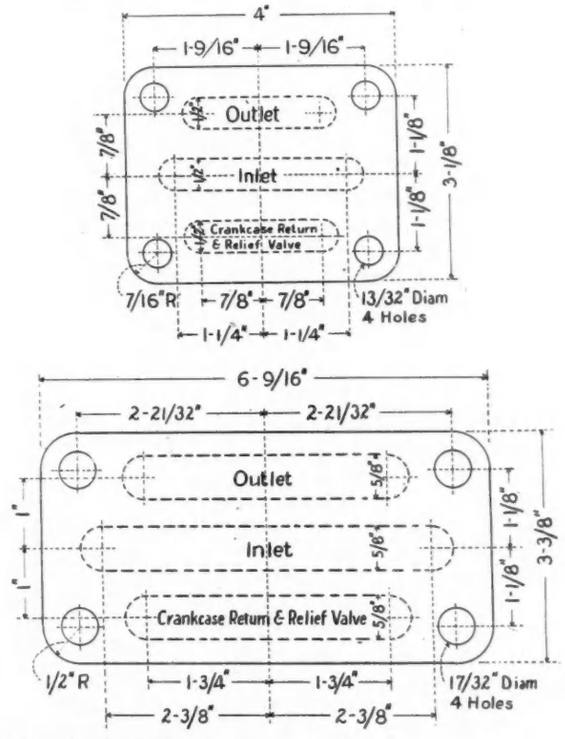
The same division submitted a table of dimensions of washers for lock nuts for ball bearings, for inclusion in the present standard for ball-bearing lock nuts and washers. The list extends to No. 22, and it is recommended that other locking means be used on larger lock nuts. In the deliberations of the subdivision that worked up these dimensions it was brought out that some trouble had been occasioned by the shearing off of the tongues of the lock washers, but it was shown that this was due to looseness of the bearing on the shaft and not to improper dimensioning of the tongues.

In S.A.E. bearing standards, as well as in the standards tables of the A.S.A., the conversion factor 1 mm. = 0.0393700 in. is being shown at present, and it is now being proposed that for practical conversions this factor be given only to the fifth place (1mm. = 0.03937 in.), which is correct to within 0.000002 in. per in. This corresponds to 1 in. = 25.4 mm. Approval was asked for this change.

Last January the Standards Committee approved a change in the fillet radius and the shaft shoulder height for annular ball bearing No. 39 of the light series, and it was now proposed to make this same change in the American Standard for light series annular ball bearings (for which the S.A.E. is sponsor). The A.S.A. Sectional Committee on Ball Bearings had recommended that the S.A.E. standards for the separable (open) type of ball bearing and the angular contact type of ball bearing be adopted as American standards, and the proposition was submitted to the Standards Committee.

The Gasoline Engine Division recommended the standard mounting bases or pads for oil filters on engines represented by the drawings herewith. It is understood that these are already in use by at least five filter manufacturers.

A lengthy report on piston ring and groove standards, the work of H. M. Bramberry of the Perfect Circle Co., was submitted to the committee. The items covered include piston ring and groove widths, ring widths for cylinder diameters, number of drain holes,



Standard oil-filter mounting pads (Small size and dual type)

drain hole sizes and piston ring diameters and groove bottom diameters for cast-iron and aluminum pistons. For each of four nominal widths of rings the maximum and minimum widths of rings and grooves, for two ranges of nominal diameters, are specified. Ring widths recommended for different cylinder bores are given in the following table:

Cylinder Diameters In.	Comp. Rings	Ring Widths, In. Oil Rings			
2 to 4 7/16	1/8	1/8	5/32	3/16	
4½ to 5 7/16	5/32		5/32	3/16	1/4
5½ to 6 7/16	3/16			3/16	1/4
6½ to 8	1/4				1/4

NOTE: Oil Ring Widths or Combinations of Widths, shall be selected from the Widths Specified between the Diameters Listed.

Committee Report at White Sulphur

For each of the four ring widths a size of drain hole of a diameter 1/32 in. less than the width is recommended.

Number of drain holes recommended range from eight for cylinder diameters of 2 to 2½ in. to 17 for cylinder diameters of 8 in. and over. A table is included in the proposal which gives for the full range of cylinder bores from 2 to 8 in. the radial thickness of the rings and the ring groove bottom diameters for cast-iron and aluminum pistons respectively, and for compression rings and oil rings respectively. The ring groove bottom diameters proposed for aluminum pistons were calculated from the formula:

$$A = D - (2T + 0.006D + 0.020)$$
$$B = A - 0.010$$

A = High limit bottom diameter.
B = Low limit bottom diameter.
D = Standard cylinder diameter.
T = Maximum ring thickness.

For cast-iron pistons the factor "0.006D" in the foregoing formula should be "0.004D."

It is recommended that the joint clearance for rings for cylinder diameters 2 to 4 15/16 in. inclusive be 0.007 to 0.017 in., and for cylinder diameters 5 to 8 in. inclusive, 0.010 to 0.020 in.

Standardization of free-wheeling lubricants has remained a subject for controversy. During the past half year it has been discussed at meetings held at Washington, Detroit and Tulsa, and as a result of these meetings and of letter ballots of the Lubricants Division, it was proposed to the Standards Committee that the latter publish in its Handbook, "for information and trial," certain data on and a classification of free-wheeling lubricants. The information which it is proposed to print includes the following:

"Free-wheeling transmission lubricants shall be properly refined, and free from water, sediment, or any other substances detrimental to the proper performance of the lubricant. Fillers or abrasives such as talc, pulp, cork, fuller's earth, graphite, mica, asbestos, etc., are not permissible. Saponifiable oils or compounds derived therefrom are not excluded unless their use causes the lubricant to fail to meet other requirements. Lubricants which have an artificial viscosity are not permissible.

"Free-wheeling lubricants of the extreme pressure type shall meet the viscosity requirements of Tables A and B. They shall be designated by the letters E.P."

Three viscosity grades are again recommended, the 80 F.W. for use at temperatures above—15 deg. Fahr.; the 90 F.W. for use at above 15 deg. Fahr., and the 110 F.W. for use at above 40 deg. Fahr. It is stated that these lubricants should not "channel" at temperatures above—10 deg., 0 deg. and plus 10 deg. Fahr. respectively. Two tables are included in the report, the first of which gives the minimum Saybolt viscosity at 210 deg. Fahr. for any specific gravity at 60 deg. Fahr., for each of the three grades, and the second the maximum permitted Saybolt viscosity at 100 deg. Fahr. for any actual Saybolt viscosity at 210 deg. Fahr., for each of the three grades.

The Non-Ferrous Metals Division proposed the adoption as an S.A.E. Standard of specifications for five aluminum-base and two zinc-base alloys for die-casting purposes. These specifications have been worked up in collaboration with the A.S.T.M., and it was agreed by the two organizations that when they publish the specifications, each of them will append to each specification a note to the effect that: "This specification conforms in composition and physical requirements to (A.S.T.M. or S.A.E.) specification number ———."

The two accompanying tables give the compositions of the seven die-casting alloys.

Specifications of Zinc-Base Alloys

	No. 903	No. 921
Aluminum	3.5-4.5	3.5-4.5
Copper	0.10 m.*	2.5-3.5
Magnesium	0.03-0.12	0.02-0.12
Iron	0.10 m.	0.10 m.
Lead	0.007 m.	0.01 m.
Cadmium	0.005 m.	0.005 m.
Tin	0.005 m.	0.005 m.
Total Other Impurities	0.02 m.	0.02 m.
Zinc	Remainder	Remainder

* Maximum.

The parts and Fittings Division submitted a new table of dimensions for ball studs, the reason for the revision being that a change in manufacturing practice has made it desirable to make the ball of the full nominal diameter, whereas formerly, when the studs were produced on screw machines, the ball was made sufficiently smaller in diameter than the bar stock to assure its being finished all over.

The division also recommended that the S.A.E. recommended practice for lubricator cups be canceled as obsolete. This "practice" refers to sight-feed oil

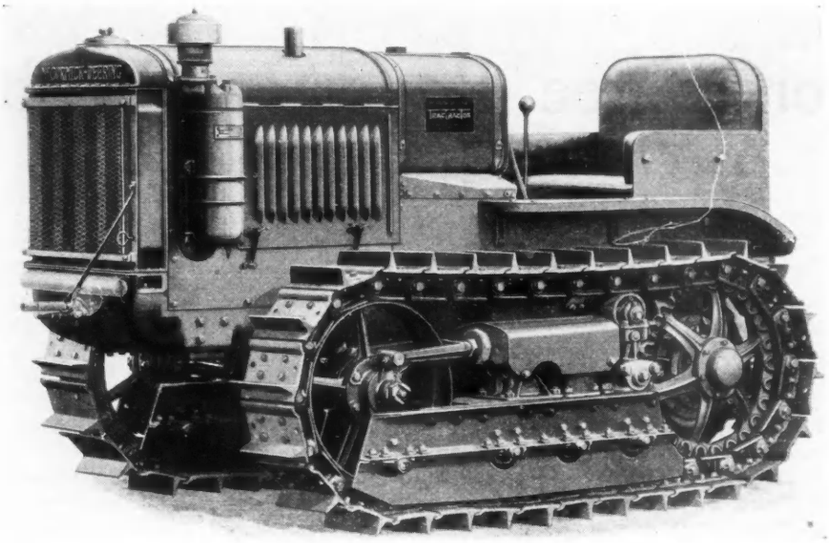
(*Turn to page 895, please*)

Specifications of Aluminum-Base Alloys

	No. 204	No. 205	No. 207	No. 209	No. 212
Silicon	4.5-6.0	11.0-13.0	4.5-5.5	1.0-2.5	1.0-2.0
Copper	0.6 m.*	0.6 m.	3.5-4.5	3.5-4.5	7.0-9.0
Iron	2.0 m.	2.0 m.	2.25 m.	2.5 m.	2.5 m.
Zinc	0.75 m.	0.75 m.	0.75 m.	0.75 m.	1.0 m.
Manganese	0.3 m.	0.3 m.	0.3 m.	0.3 m.	0.3 m.
Magnesium	0.1 m.	0.1 m.	0.1 m.	0.1 m.	0.1 m.
Nickel	0.5 m.	0.5 m.	0.5 m.	3.5-4.5	0.5 m.
Tin	0.1 m.	0.1 m.	0.1 m.	0.1 m.	0.1 m.
Other Impurities	0.2 m.	0.2 m.	0.2 m.	0.2 m.	0.2 m.
Aluminum	Remainder	Remainder	Remainder	Remainder	Remainder

*Maximum.

McCormick TracTractor is shown at right



McCormick TracTractor Passes University of Nebraska Tests

A NEW tracklayer model tractor of the International Harvester Co., the McCormick-Deering TracTractor, underwent its official tests recently at the Agricultural Engineering Department of the University of Nebraska, and was awarded official test certificate No. 199.

This tractor is equipped with a four-cylinder, vertical, valve-in-head engine of 3¾-in. bore and 5-in. stroke, mounted lengthwise on the chassis. The rated speed of the engine is 1250 r.p.m. Port diameters are 1.562 in. for both the inlet and exhaust. The belt pulley is 3.973 in. in diameter and has a face of 8 in.; its speed of revolution is 682 r.p.m. The engine is fitted with a 1¼-in. Zenith carburetor, a magneto manufactured by the International Harvester Co., a centrifugal governor and an oil-and-fiber-type air cleaner. Lubrication is by the circulating splash system.

The tractor, as stated, is of the tracklayer type. The tracks are driven through a single-plate, foot-operated, dry clutch and a three-speed transmission, the advertised speeds being 1¾, 2¾ and 3¾ m.p.h., with a speed of 2 m.p.h. in reverse gear. The track has a length of 15.125 ft. and a face of 10 in. Cleats 2 in. high and 10 in. long are formed integral with the track shoes. An upholstered seat is furnished with this tractor. The weight of the machine as tested, with driver, was 7010 lb.

Kerosene was used as fuel during all tests, that used in the brake tests weighing 6.76 lb. per gal., and that used in the drawbar tests, 6.78 lb. per gal. The total oil supplied to the engine amounted to 4.683 gal., and the total amount drained off to 5.760 gal. Oil was drained to the middle cock and refilled to the top cock after approximately each 10 hours of operation. All of the oil was drained at the end of the tests, which lasted 50 hours.

In the maximum (brake) load test of one hour's duration the engine developed 26.59 hp. at 1248 r.p.m., with a specific fuel consumption of 0.673 lb. per hp.-hr. The air temperature was 71 deg., and the temperature of the water leaving the engine jacket 177 deg. In the rated load test of one hour's duration the engine developed 25.12 hp. at 1248 r.p.m., with a specific fuel consumption of 0.687 lb. per hp.-hr. In the variable load test the fuel consumption varied from 0.57 gal. per hour for an output of 0.70 hp. to 9.92 gal. per hour for an output of 26.29 hp.

In the drawbar horsepower tests, the 10-hour test in intermediate gear showed a drawbar pull of 2528 lb. at 2.68 m.p.h., corresponding to 18.04 drawbar hp. The specific fuel consumption was 0.932 lb. per drawbar hp.-hr. In the maximum load test the tractor developed a drawbar pull of 5156 lb. at 1.70 m.p.h. (23.33 hp.) in low gear, with a slippage of 3.12 per cent; 3160 lb. at 2.69 m.p.h. (22.63 hp.) in intermediate gear, with a slippage of 1.22 per cent, and 2007 lb. at 3.77 m.p.h. (20.19 hp.) in high gear, with a slippage of 0.68 per cent.

No repairs or adjustments were required during the tests, and no excessive or unreasonable claims were found in the advertising literature.

The highest permissible rating of this tractor under the official tractor rating codes is 18.33 drawbar hp. and 25.31 belt hp.

Bosch Combines Diesel Governor and Fuel Pump

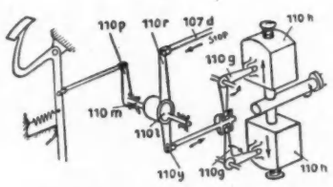


Fig. 1—Diagram of Bosch governor for Diesel engines

PRACTICALLY all high-speed Diesel engines are provided with a governor to prevent them from racing when the load is removed. Since the governor always acts on the injection pump, varying the quantity of fuel injected per cycle in accordance with the momentary requirements, and since the pump must be driven from the engine crankshaft the same as the governor, it seems to be a very logical plan to combine pump and governor in one unit.

Such a combined injection pump and speed governor has been developed by the Robert Bosch Co. (United American Bosch Corp., Springfield, Mass.), and is illustrated herewith. It is pointed out by the manufacturers that automotive Diesel engines have the characteristic of being rather unstable at idling speed; if the amount of fuel injected is slightly too large, they will race, while if it is slightly too small, the engines will stall.

It is therefore necessary to fit such engines with governors which will properly proportion the fuel charge at idling as well as at normal working speeds, and the Bosch is a combined minimum-speed and maximum-speed governor.

The device consists essentially of a pair of flyweights, a linkage and a housing. As shown by one of the illustrations, the governor is built directly onto the injection pump, with the object of simplifying the control linkage as much as possible.

Referring to Fig. 1, mounted on the shaft of the injection pump, are two centrifugal weights *110 h*, which with an increase in speed move away from the shaft, this motion being transmitted through the two bellcranks *110 g* and the movable fulcrum lever *110 r* to the control rod *110 d* of the injection pump, which is moved to reduce the fuel injection. This reduces the speed again. If the speed drops below that for which the governor is set, the weights move in the opposite direction and the quantity of fuel injected is increased.

The speed of the engine may be controlled independently of the governor by means of the accelerator pedal. If the driver presses on the pedal, the lever *110 p*, and with it the eccentric *110 l*, is turned through an angle toward the right, which compels the movable-fulcrum lever *110 r* to make a similar rotary movement, thereby moving the control rod of the injection pump so as to increase the fuel delivery. The engine then accelerates. Transmission of the governor control motion and of the control motion of the pedal to the control rod is effected by means of the movable-fulcrum lever *110 r*. In the first case this lever rocks around the axis of the eccentric; in the second, around the link-joint axis *110 y*.

The precise way in which the governor limits the maximum speed is illustrated in Fig. 3, from which it may be seen that each flyweight is provided with a light spring *110 d* for idling and with a heavier spring *110 f* for maximum speed. As long as the engine operates at idling speed, only spring *110 d* is loaded by the centrifugal force on the flyweights. If the accelerator pedal is pressed down and the speed of the engine thereby increased, the flyweights, owing to the increased centrifugal force on them, come up against the spring washer *110 w* of the stronger spring *110 f*. In this position they remain throughout the normal speed range of the engine, for the heavy springs are put under such great initial pressure that any increase in the centrifugal force on the weights within this speed range is not sufficient to overcome the spring force. Through this part of the speed range the governor is therefore out of action, and any change in speed is brought about by motion of the accelerator pedal.

If the accelerator pedal is depressed beyond a certain point, the amount of fuel injected is further increased and the engine speeds up further. The centrifugal

(*Turn to page 887, please*)

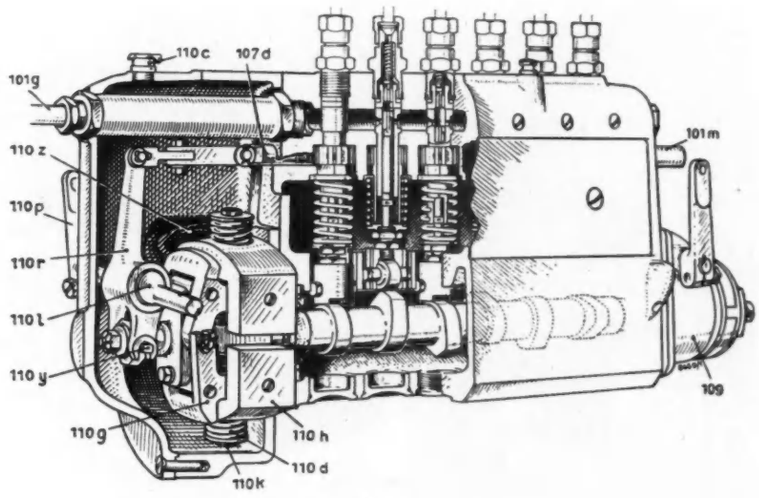


Fig. 2—Cutaway view of injection pump with governor

Seneca Falls Makes New Contribution To Fast Production

WHAT we saw and reported of a private showing at the last S.A.E. production meeting in Detroit can be told in detail now. It is a striking application of automatic loading (patented) which is contributed to the cause of mass production by the Seneca Falls Machine Co., Seneca Falls, N. Y.

The idea is to mechanize to the fullest extent particularly on the fast jobs where there is considerable hazard to the operator. With the principle of automatic loading extended to a complete battery of automatic machines, the saving in labor is said to be in the order of 80 per cent.

In operation, the rough forgings of a steering gear sector shaft are snagged and cut to length by an operator who also supervises the three machines. After the forgings have been cut to length the operator places them on the conveyor shown at the left which carries them to the centering machine. The centered forging is then picked up by the fingers and carried to the rough-turning machine where it is placed between centers ready for turning. Simultaneously, another set of fingers picks up the forging that has been rough-turned and places it in the finish-turning machine and another set of fingers removes the finish-turned piece and delivers it on the chute at the right.

The three machines used in this set-up consist of an automatic centering machine, made by the use of two Kingsbury heads and two standard Model U Automatic Lo-Swings. After the machining has been completed the carriages return to the starting position and the spindles stop. At this point the automatic loading arrangement is thrown in by switches placed on the machines. The sequence in operation of loading are as follows:

First—The fingers are lowered and grip the work.

Second—The tailstock spindles are withdrawn.

Third—Fingers lift work.

Fourth—Heads carrying fingers traverse to the right to positive stops which locate each individual head in respect to the machine it is serving.

Fifth—Work is lowered into the machines.

Sixth—Tailstock spindle advances holding work on centers.

Seventh—Fingers open.

Eighth—Fingers are lifted.

Ninth—When all heads are clear, machines are started.

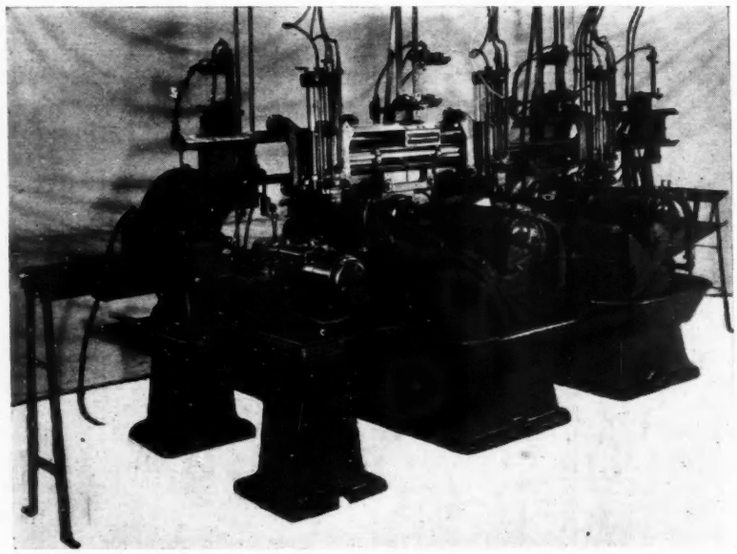
Tenth—Heads traverse to the left ready to repeat cycle as outlined.

The various movements of the loading mechanism are obtained hydraulically, there being a cylinder and piston for providing the longitudinal or tranverse movement, and cylinders for raising and lowering the gripper fingers. Tailstock spindles also are operated hydraulically.

The oil reservoir, pump and electrically-operated control valves are contained in a separate unit.

Control of the various movements of the loading device is obtained through electric switches which operate solenoid valves. The control is so arranged that the completion of each movement starts the next movement, so that the automatic loading arrangement is always in time. For instance, in removing a piece of work from the machine the fingers first come down and grip the work. The closing of the fingers on the work makes a contact which actuates the tailstock spindle withdrawing the center from the work. When the center has receded a proper distance it makes a contact which causes the heads to raise. This arrangement makes it impossible for the unit to get out of time. Such an arrangement is necessary in automatic loading if the unit is to function with a minimum amount of the operator's attention.

On the job in question one operator snags, cut to length, centers, rough and finish turns 93 pieces per hour. Although the actual machining time compares favorably with machines manually operated the total production per day is greater because they operate continually.



Two Model U Lo-Swing lathes and an Automatic Centering Machine as set up for fast jobs

Springs Research

Report of the Springs Research Committee of the Department of Scientific and Industrial Research. Obtainable from British Library of Information, 270 Madison Ave., New York.

This is a general report of the Springs Research Committee which was appointed in 1922 and has carried on a considerable number of researches on specific subjects. It contains a summary of the results obtained or conclusions reached in these researches. The Report also includes a bibliography on the subject of springs, a list of published papers and reports dealing with researches carried out.

JUST AMONG OURSELVES

Would the Babies Ride Big Waves?

BEGINNING to get some comments about $300-$350 car possibilities as a result of "The Little Giant" story of a few weeks back. Soon we may have enough to make another story out of giving other people's opinions—having started out by airing our own.

One question stands out:

"Must the $300-$350 car be of such a character as to fit into our American economic scheme only in case the current attitude toward spending continues? Or can it be an automobile which might win its way in a period when the average man is looking for finer and better things?"

That's the first question which any manufacturer contemplating such a car should ask himself. If the answer to the first question is "Yes," then he has simply to decide whether or not he thinks the depression is going to last another five years or not. Returning prosperity would put his new car out of the picture as a serious factor.

The thinking of the industry on this question should avoid being driven too strongly by the immediate business outlook. In thinking about small car possibilities, definite consideration should be given to the place of such a vehicle when public buying psychology changes again, as it will do some time.

Auburn Price Cuts Bruise a Trend

THE slashing reductions in both list and delivered prices made by Auburn last week cuts across this current trend. Whether it will change the thinking of other manufacturers on the price subject remains to be seen. The Auburn reductions seem to be based on the idea that a number of sales with small profit actually will help its dealer organization more than potentially large profit on sales never made at all.

The program is designed, avowedly, to fit selling conditions in the immediate future. Whatever may be said about the move by others in the industry, a goodly number of cars are being moved.

With Accent on Delivered List

INCIDENTALLY, delivered prices exclusively were featured in the local advertising campaigns which accompanied this Auburn cut, in this respect tying in with the trend of thinking among many other car makers today. It still is doubtful that we ever will get on a delivered price basis throughout the industry, but we might arrive there some day at that.

From the standpoint of the public, delivered prices would seem to be most desirable. Adoption of them involves many doubtful angles, though, within the trade and industry. Interestingly enough, we find dealers somewhat split in their attitude. One group opposes delivered price advertising on the ground that it eliminates the dealers' only chance to make a profit—namely, the chance of a little extra padding in handling charges, etc. The other group favors delivered prices because it thinks the chance for extra padding to be better. Well, well, it's an odd world.

Pulitzer Prizeman Returns With Buick

WALTER DURANTY, *New York Times* Russian correspondent, on vacation in this country for the first time in six years, comments on Russian newspapers interestingly. One statement of direct automotive interest he makes is:

"There is no competition in the Russian newspaper business. They don't care a whoop about advertising. They ignore the human side of the news, but will print what they consider the picturesque angles, such as accounts of hiking trips in the mountains, sports contests among the workers, *or a road test of a new automobile.*"

The interview with Duranty by John F. Roche in the June 4 issue of *Editor & Publisher*, from which the above sentence is taken, is a pip. It's worth getting and reading whether you're in the newspaper business or not.

The interview closes with: "Mr. Duranty will return to Russia, taking with him an American car for more convenient travel, and, of course, the added dignity of the Pulitzer Prize." We snooped a bit and learn that the car is a second-hand Buick.

"Genuine" Parts Market Abroad

THE battle for the replacement parts market between car manufacturers and independent parts makers extends not only throughout the United States but also in foreign markets. And in some overseas countries at least the car makers have competitive advantages which always will be denied them in the domestic field. An important distributor of independent parts in Denmark, for example, writes us a most interesting letter in which he tells of the determined effort being made by Ford and General Motors in particular to bind all their dealers to sell and buy only "genuine" parts and details also recent Chevrolet reduction of prices on fast moving parts in that market to a point well below that of independent competition.

—N. G. S.

Thermal Power: Brennan Engine: Handbook

BYRD CARDOZA of Virginia Beach, Va., who has been engaged in the electric vehicle industry for many years, proposes to solve the house-to-house delivery problem of such commodities as bread, milk, etc., by the use of a power system comprising a steam engine which is supplied with steam from a store of superheated water carried on the vehicle, the tank being recharged with hot water from an ordinary stationary boiler at night.

Mr. Cardoza has found that on routes on which less than 15 miles are covered per day, the electric delivery wagon is uneconomical, on account of its high first cost and heavy interest charges. Stored hot water is now widely used in small fireless industrial locomotives and in powerplants. It is figured that a small multicylinder simple-compound steam engine would consume from 12 to 24 lb. of steam per horsepower per hour. If the pressure of the steam on the water is lowered from 100 to 25 lb. p. sq. in., 5.3 lb. of steam is given off by every cu. ft. of water carried. About 50 cu. ft. of water could be carried in the space under the hood and below the body in which the battery is located in an electric vehicle, and this would yield 265 lb. of steam, which, Mr. Cardoza figures, would develop 17 hp.-hr. This compares with 16 hp.-hr. available when an electric vehicle is equipped with a 12 kw.-hr. battery.

The principal advantages claimed for the system are that it is exceedingly simple and that it can be operated more cheaply than any other power system. One disadvantage admitted is the great weight of the water, the 50 cu. ft. weighing more than 3000 lb., or over 1000 lb. more than the 12 kw.-hr. battery, but it is hoped to compensate for this by reduction of the weights of other parts. The container, which must be sufficiently strong to withstand the steam pressure within it, as well as inertia forces, also would have to be of very considerable weight. Another thing to be considered is that if the steam pressure is to be reduced from 100 to 25 lb. p. sq. in. between chargings, as the pressure decreases, either the speed of the car will decrease very materially or else the ratio of expansion has to be decreased, which will lower the efficiency of the cycle and might make it impossible to obtain a horsepower-hour from 24 lb. of steam at such a low pressure as 25 lb.

Some further details of the plan were given by Mr. Cardoza in a paper presented by him at the annual meeting of the Virginia Academy of Science in Richmond in April, the paper being entitled "Scientific and Economic Elimination of the Horse on Multi-Stop Short Routes."

Brennan Sixes for Buses

BRENNAN MOTOR MANUFACTURING CO. of Syracuse, N. Y., one of the pioneer manufacturers of automotive gasoline engines, has recently placed on the market two new six-cylinder engines specially designed for use on buses and for similar service. The Model B70 has a bore of 4 in. and a stroke of 5½ in., while the Model B100 has a bore of 4⅜ in. and a stroke of 5½ in. The displacements are 414.7 and 496 cu. in., and the weights 800 and 875 lb. respectively.

The cylinders are cast in two blocks of three each of semi-steel (high-tensile cast iron), and the cylinder bores are finished by grinding and lapping. The cylinder head, which is also of semi-steel, is in one casting extending over all of the six cylinders. It is held in position by a large number of nickel-steel studs and is provided with two screw jacks at the front end and one at the rear, by means of which it can be removed without danger of injury to the gasket. The combustion chamber, which is said to be of spherical form, is completely machined and also polished.

The crankshaft, which is made of a nickel-steel forging, is supported in main bearings which are 2¾ in. in diameter by 3¼ in. long. Its massiveness is reflected by its weight, which is 120 lb. when finished. Connecting rods are 11 in. long between centers, or exactly twice the stroke, and connect to the semi-steel pistons by floating piston pins 1 11/64 in. in diameter. Connecting rods have four-bolt caps, and pistons are fitted with three rings each.

All valves are located in the cylinder head and operated from the camshaft in the crankcase through side rods. Exhaust valves are made of chrome-cobalt steel and inlet valves of a low-tungsten steel. Camshaft drive is through gears with helical teeth, the train being composed of four gears, viz., the crankshaft pinion, an intermediate gear, the camshaft gear and the accessories driveshaft gear. Faces of all gears are 1¼ in. wide. The valve mechanism on top of the engine is inclosed by a polished aluminum cover.

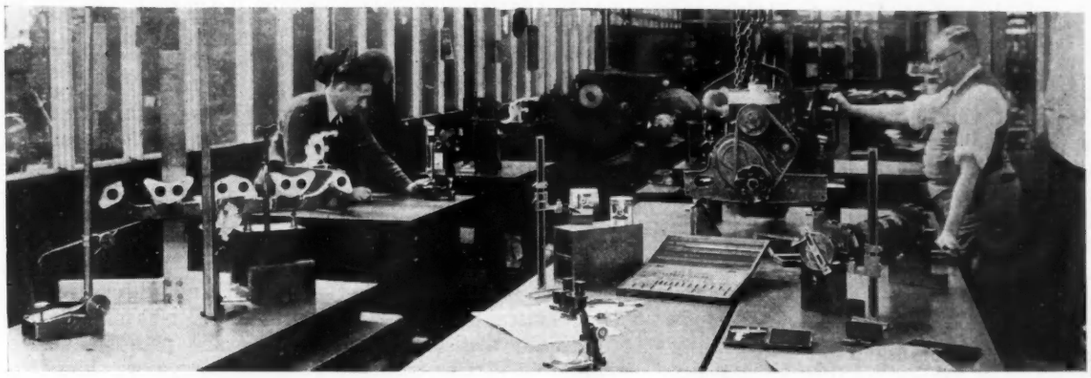
Lubrication is by the pressure system, the oil being forced through drill holes in the crankshaft to the crankpin bearings and through a hollow fulcrum shaft to the rocker levers on the cylinder head. The oil pump, which is driven through helical gears, is so located that it is primed automatically and can be removed from the engine without disturbing any other parts.

General Engineering Handbook

General Engineering Handbook. Charles Edward O'Rourke, editor-in-chief. McGraw-Hill Book Company, Inc., New York.

THIS is a work of the general character of engineering handbooks such as Kent's and Marks', but its scope is wider, since it covers civil and electrical as well as mechanical engineering, and as it contains only about half as many pages as the standard handbooks, the amount of space devoted to any one subject is naturally much more restricted. It is stated in the Preface that engineers specializing in any of the branches of engineering above mentioned often have need for some knowledge of the other branches, and this book aims to supply that knowledge and in a form so its application requires the exercise of the minimum of judgment on the part of the user. About 30 writers have contributed to the volume.

• PRODUCTION LINES



Master inspection department of the Chrysler organization. Finished parts from every department are checked here daily against blueprints. Note that the worktable tops are accurate surface plates

Life of Industry

Can't say too much or too often that research is the life-blood of an engineering industry. Good evidence of its status is the fact that research has persisted during the past slump in business.

We see plenty of activity in many directions. Take cutting oils. Be prepared for a big change when you start cutting metal in earnest.

Some of the leaders in the field will be prepared with new products better than anything you have used before.

Vol. 1, No. 1

Greetings to another contemporary. Those who have enjoyed reading *Nickel Cast Iron News* will be glad to learn that it now has a twin brother—*Nickel Steel Topics*. According to its parent, the International Nickel Co., the latter will serve the people using nickel steels. It will feature informative data as to plant practice, metallurgy, applications, etc.

Shapes and Shapes

Somewhere you have or will have a problem which may be solved by the use of rolled or formed sections, instead of complicated machining or casting procedure. At any rate, it may comfort you to have on hand a copy of the new "Handbook—Rolled and Formed Sections." On request from the Truscon Steel Co.

For Best Results

Recognizing the growing influence and use of tungsten and tantalum-carbide tools, the Norton Co. has completed another investigation of grinding practice. Look for it in *Grits and Grinds* for May, 1932. The discussion centers about the several methods of grinding and the kinds of grinding wheels that ought to be used for best results. The following 10 points conclude the article:

1. Always grind toward (never off) the cutting edge; feed the grinding wheel only when rotation of the wheel and movement of the table (in surface grinding) are toward the cutting edge.

Production Men

This is your page.

Any suggestions you have on new methods or kinks may be of value to men in other factories.

If you are working on some new development, we'd like to know about it—even if not for publication with your company's name.

2. Grind either *all* wet or *all* dry. Intermittent cooling causes strains and cracks.

3. Use lighter wheel feeds and softer wheels when grinding the harder grades of carbides.

4. Use soft, open-structured wheels for broad contact and relatively harder, closer-structured wheels for narrow contact.

5. Appoint and train one man or a special crew to grind all the tungsten and tantalum carbides in your plant.

6. Never quench a tool tip in water to cool it after grinding. If air cooling is not fast enough, hold the steel shank in water but not the tip.

7. Keep front clearance angle beneath the cutting edge as small as possible, consistent with requirements of the job.

8. The grinding machine should be in first-class condition and must be at least as vibrationless and accurate as the machine in which the tool is to be used.

9. Keep the tool tip moving across the wheel face when grinding offhand to avoid disastrous localized heating.

10. Regrind or lap as soon as there is any sign of wear. Worn tools fail due to excess pressure and friction.

Tried Welding?

On numerous occasions we have mentioned the remarkable advances of the welding art. In the heavy-duty field it has distinguished itself by supplanting cast construction. Wherever adaptable, welded construction properly engineered should decrease weight, reduce cost, increase strength, increase resistance to fatigue. One of the most successful exponents of welding is Lukenweld, who show some of their recent achievements in an interesting booklet, "Lukenweld Construction," just off the press. Perhaps the most significant thing from the automotive engineer's point of view is welding technique applied to heavy-duty Diesels, crankcases, base, bearing blocks and the like. Other applications are for machine tools, speed reducers, and the gamut of heavy cast steel and iron machine members.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

Thiokol, Synthetic Rubber, Resists

APPLICATIONS of molded rubber products for the automotive industry have been growing by leaps and bounds. Gaskets, washers, diaphragms, gasoline lines and the like are fairly common. But the list is swelled by current developments such as floating power, engine mountings for vehicles and aircraft, body insulation, chassis mountings, and a host of other places too numerous to mention.

But the service problems of automotive rubber goods are not at all simple. Parts are subjected to many swelling and deteriorating liquids; crude oil and its distillation products — gasoline, kerosene, lubricating oils; commercial organic solvents such as benzol and carbon tetrachloride; lacquer paints and thinners are typical examples. Small wonder then that it is so difficult to make products capable of maintaining their original elasticity, strength, and physical dimensions for any reasonable length of time.

Naturally much research work has been directed at this problem. And into the picture comes Thiokol D66, a new synthetic material from the laboratories of the Thiokol Corp.

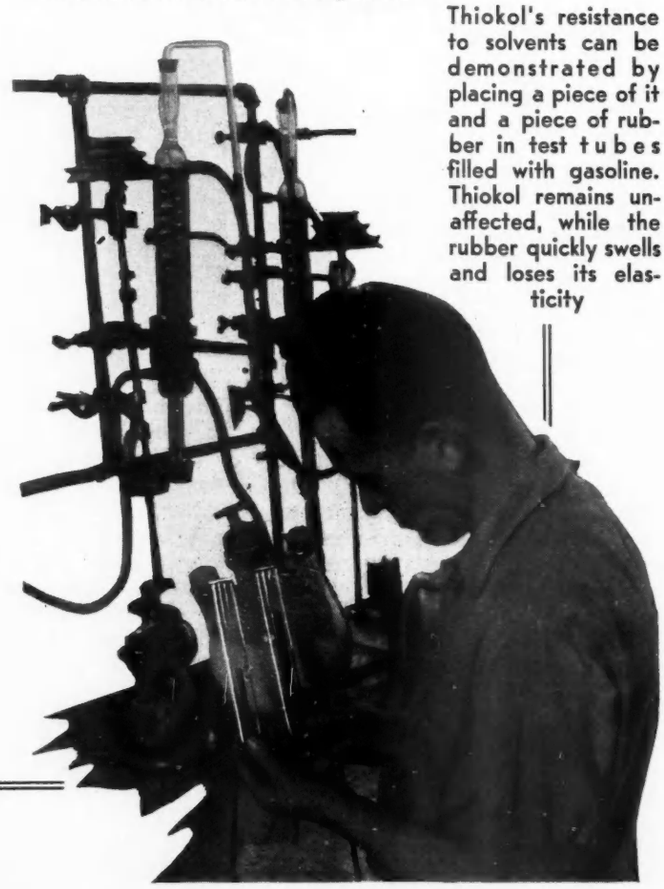
It is purely a synthetic product and differs widely in chemical composition from rubber. It has been commercially available for some time and performance is based on service records extending over more than two years.

Thiokol is the base material from which many rubber-replacing products have been made for the automotive industry for current production.

Table I

Characteristics of Thiokol

1. The following alcohols have been tested: Methyl, Ethyl, Butyl, and Amyl.
2. Distilled water as well as dilute or concentrated salt solutions are not harmful.
3. Phenol (5 per cent) has no effect.
4. Sulfuric, up to 50 Be., hydrochloric and acetic acids give no trouble. It is not recommended for strong nitric acid or chromic acid applications.
5. While strong alkalis, as 20 per cent caustic soda and concentrated ammonia solutions, affect Thiokol, in weak alkalis it stands up for fairly long periods.
6. Hardness as measured by the Shore comparing Durometer will vary from 54 to 90, according to the compound.
7. The specific gravity of the different compounds will vary generally from 1.60 to 1.80 or even higher.
8. Because it has been found that carbon black has considerable value as a compound ingredient, Thiokol products usually will be black in color.
9. As is to be expected from its chemical nature, it does not age or "perish" in storage.
10. Oxygen does not appear to affect Tziokol—in fact, even the oone generated during electrical corona tests does not cause degradation.
11. Thiokol compounds exposed to the sunlight do not show surface checking.
12. Can be made to unite to rubber during vulcanization. It can be pressed on woven parts, or as a sheeted layer to protect the surface of many materials from the action of liquids.
13. Ordinarily not recommended for temperatures above 150 deg. to 175 deg. Fahr. At 10 deg. Fahr. below zero most stocks while much stiffer than at room temperature are still not brittle but somewhat flexible. The actual condition depends to some extent on the compound. Some stocks can be compounded that do not become too stiff at minus 30 deg. Fahr.



Thiokol's resistance to solvents can be demonstrated by placing a piece of it and a piece of rubber in test tubes filled with gasoline. Thiokol remains unaffected, while the rubber quickly swells and loses its elasticity

Deterioration by Oils, Gasolines, Etc.

Usual Solvents Fail to Attack New Compound Now Offered for Automotive Applications

Thiokol D66 is made by the chemical interaction of ethylene dichloride ($C_2H_4Cl_2$) and sodium polysulfide (Na_2S_x). By analysis, it will show essentially 15.5 per cent carbon, 2.5 per cent hydrogen and 82 per cent sulfur. It is important to understand that the high sulfur content is not present as a mechanical mixture, but is in actual chemical combination with the other elements.

Thiokol D66 is homogeneous, firm and dense, but pliable. It is opaque and pale yellow in color. It has a characteristic odor. The specific gravity is approximately 1.59. It burns slowly when ignited, becomes somewhat plastic when heated but does not melt. There is no chemical deterioration over long periods. Even in its raw state it is insoluble in any of the usual solvents.

Compounding is said to be more simple than that of rubber for two reasons—first, even the raw material itself is chemically unaffected by nearly all liquids, and second, there is no necessity to take into account when compounding, the possible aging or "perishing" of the finished product due to oxidation, light or even direct sunlight.

Curing and compounding ingredients are mixed into Thiokol with the same type of machinery used for rubber manufacturing. Shaping by calendering or extrusion, and curing procedure, require only a few deviations from the known methods now employed.

So far the companies engaged in fabricating Thiokol D66 are:

Manhattan Rubber Mfg. Division—Passaic, N. J.
Johns-Manville Corporation—Manville, N. J.
Garlock Packing Company—Palmyra, N. Y.
Vulcan Proofing Company—Brooklyn, N. Y.
General Cable Corporation—Rome, N. Y.
Okonite Company—Passaic, N. J.

Some others are completing their development and field tests and are planning early production activity.

Low Melting-Point Alloys Developed

A NEW alloy composed of bismuth, lead, tin and cadmium, and known as Bendalloy, has been placed on the market by the Cerro de Pasco Copper Corp., 44 Wall Street, New York. It melts at 160 deg. Fahr., and is intended as a filler for bending tubing.

In making use of this alloy, one end of the tube is closed with a cork, rubber or other stopper, the Bendalloy is melted under water in a clean ladle, and when the water has reached the boiling temperature, the tube is filled with boiling water and the water is then replaced by Bendalloy.

The hot water preheats the tube and assures that it fills completely with Bendalloy, without danger of "cold sets." The Bendalloy is chilled with cold water. The chilling is started at the stoppered end of the tube and carried progressively to the opposite end. This can be done by immersing in a tank of cold water, for instance.

Bendalloy has a low thermal conductivity and therefore cools only slowly. When the alloy has reached room temperature the tube can be bent with almost any bending equipment, provided the bends are made slowly at uniform speed and with uniform loading. The Bendalloy is then removed from the tubing in a steam bath, water bath or hot air bath at the temperature of boiling water.

A somewhat similar alloy known as Sealalloy is made by the same company for making liquid-proof joints between glass and metal tubing. The metal tubing is made of a slightly larger inside diameter than the outside diameter of the glass tube and the latter is inserted into the former for a certain distance so that the Sealalloy is not subjected to bending stresses.

Since the bore of the metal tube is slightly greater than the outside diameter of the glass tube, a small annular space is formed between the two and this fills with the sealing alloy. The latter also forms a muff around the two tubes at the joint and is said to give a positive seal which will prevent leakage. The Sealalloy probably will find application in the automotive industry in gasoline and other gages.

Provisional Standard for Valve Inserts

OUTSIDE of the aircraft-engine industry the use of separate valve seats in internal combustion engines is a comparatively new practice, but already the Institution of Automobile Engineers (England) has adopted a provisional standard covering dimensions for valve-seat inserts. It is stated that the recommendations are made at the suggestion of manufacturers of inserts and are intended for the information of users. The data will be reviewed in March 1933, and constructive comments on them are invited.

It is recommended that the valve-seat inserts be centrifugally cast. For inserts of alloyed cast iron it is recommended that the outside diameter, the manufacturing tolerance thereon, and the diameter of the recess in the cylinder in which the insert is to be fitted be proportioned to give an interference fit of not less than 0.0055 in.

The manufacturing tolerance on the outside diameter of the insert is 0.0005 in. The outside diameter is specified as nominal dimension plus not less than 0.0060 in. The diameter of the recess in the cylinder casting is to be the nominal dimension to minus 0.001 in.

Fiat "Balilla" Gets Good Italian Reception

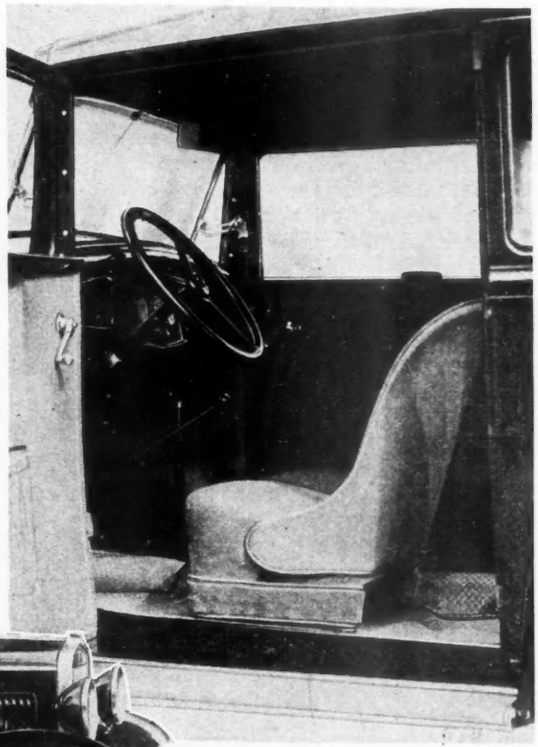
THE new Fiat car "Balilla" (briefly described in *Automotive Industries*, May 28) was received in Italy with enthusiasm, but mass production of it had not yet started on May 2. As a matter of fact, no parts were ready for assembly. Arrangements are said to be under way for mass production of Balilla parts. Deliveries to dealers were expected to begin about June 1. The first series is reported to be 25,000 units.

Thirty "hand-made" samples were turned out, some of these being presented to the head of the Government and the Royal Household, while others were sent to the automobile show in Milan. It appeared that the delay in getting into production on this model was due to failure of Swedish suppliers to deliver on time certain special steels entering into the manufacture of the car.

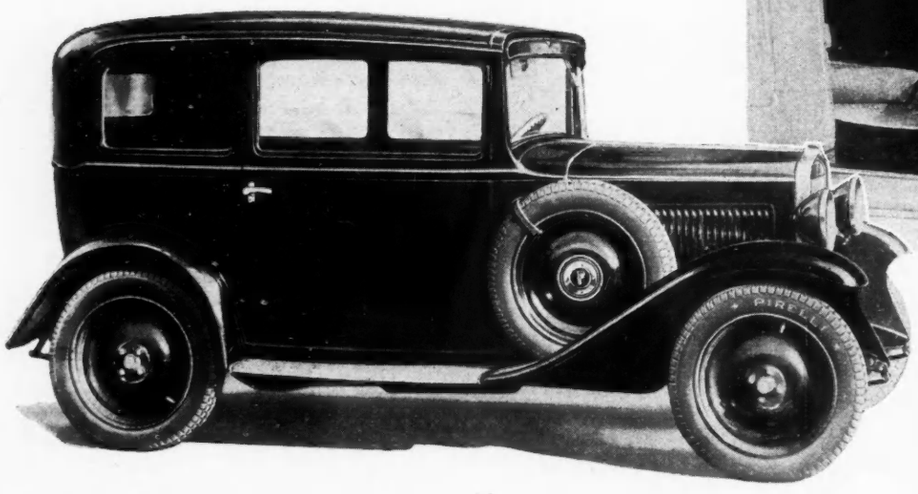
On the basis of a daily production of 100 units, it is understood that the per-car factory cost of the "Balilla" is approximately lire 5,000 (leaving a domestic-market per-unit profit of from lire 4,900 to 5,800), and if production is moved up to 175 per day, the cost per unit will come down to about lire 4,000. It is reported that on this new model Fiat will continue its usual practice of holding the domestic market price just as high as the tariff wall permits, and will sell in export markets (after payment of duty) at the same or lower prices. It is said that the model 514 Fiat is now selling in France (after payment of the high French duty on parts) at the same price as in the home market.

Early in May the Fiat automobile plant was running at approximately 40 per cent capacity. The old models are being assembled from large stocks of parts, and a stock of these cars will be held at the factory and at the various factory branches throughout the country so that dealers' requirements may be covered while all of the factory facilities are given over to the production of the "Balilla."

The "Balilla" is claimed to be practically vibrationless and the observer was impressed with what has been done to eliminate engine and road noises from the inside of the closed car. Under the rubber floor mat is a padding one inch thick, and the gasoline tank (attached to the dash, well out of the way) is covered with the same type of padding, held in place by a soft leather shield. Two American devices are used on the car, an automatic windshield wiper and hydraulic brakes. The carburetor equipment is "Zenith," of French design, but manufactured in Italy. It is reported that the Fiat management is working on an 8-cylinder model, to be known as model 530, which it hopes to present this fall. A little 2-cylinder job is apparently all ready for production whenever it is felt that the market is ready to absorb such a type of light commercial unit.



Interior of the Balilla (above) indicates roominess of the enclosed type



Balilla sedan (left) strongly resembles American design practice

Warner Electric Brakes Mounted on Tractor-Trailer Train

ELECTRIC brakes undoubtedly are particularly adapted for use on trailers, because an electric cable connection for the transmission of the brake-operating effort from the tractor to the trailer can be made quite easily. It is, therefore, not surprising that the electric brake which was brought out by the Warner Electric Brake Corp., Beloit, Wis., some years ago has found its widest application on trailers. One of the advantages claimed for the electric brake is that it is exceedingly rapid in action. The degree of application is governed by means of a 10-step controller. This is a form of rheostat comprising a number of contact leaves which are contacted successively by a curved arm as the pressure on the brake pedal is increased. As each successive leaf is contacted by the arm, a further unit of resistance is cut out of the brake circuit, whereby the current through the coil of the brake magnet is increased.

The various parts of the electric brake are shown in Fig. 1. The armature is mounted on three evenly spaced alloy steel springs. In operation the armature makes very light contact with the friction face of the magnet, but does not grip it while the car is running and the wheels are revolving. When current is applied by a light pressure on the brake pedal, the magnet becomes energized and grips the armature firmly. This causes the magnet to start revolving with the armature. Attached to the magnet are two lugs which fit into the brake band ends. The slightest revolution of the magnet is sufficient to cause the brake band to expand against the drum surface and thus set the brake.

In the operation of this brake, use is made of the self-energizing principle. All the magnet has to do is to grip the armature, thus bringing the brake band in contact with the drum, and further application is accomplished by the friction between band and drum.

Fig. 2, herewith, shows the installation of the Warner electric brake on the front wheel of a motor truck. We understand that this was made to the order of an operator who desired electric brakes all around on a tractor-trailer train.

Fig. 3 shows the new standard 16⅞ by 4-inch Warner electric brake, which is said to be light in weight and extremely rugged, and to have more lining area than any other brake of its size.

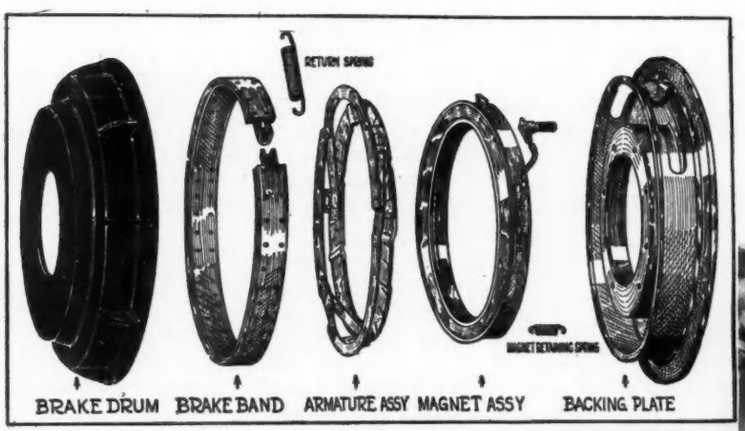


Fig. 1—Components of Warner electric brake

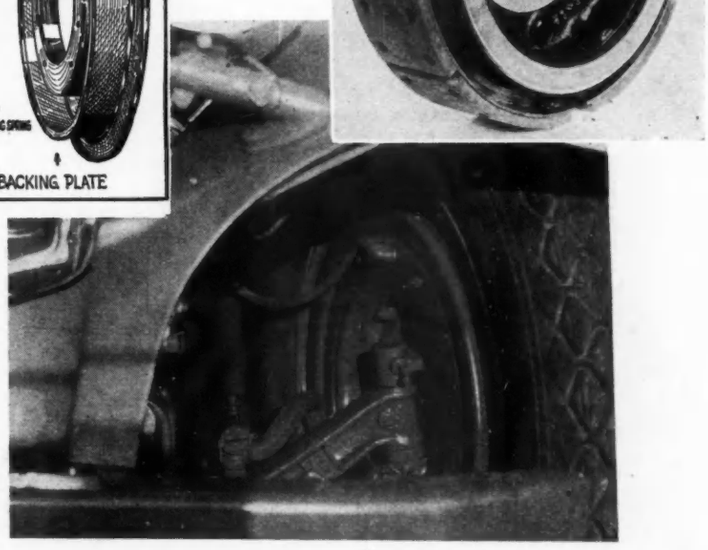


Fig. 2—Warner electric brake installed on the front wheel of a motor truck

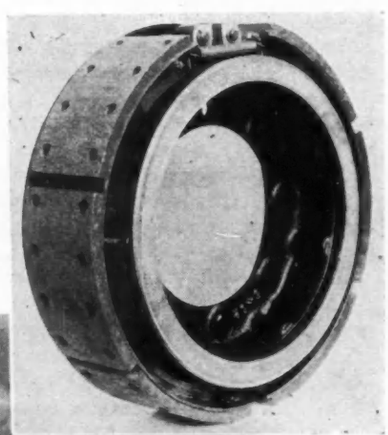


Fig. 3—New standard 16⅞ by 4-inch Warner electric brake

Graham Designs Six; Similar to the Eight

With list prices from $875 up, the new model is only 5 in. shorter than the 8-cyl. car and is said to give excellent low-speed performance

A NEW six-cylinder model, similar in general appearance to the Graham eight which has been notable among 1932 models by reason of its striking lines, has just been announced by Graham-Paige Motors Corporation. Having a wheelbase of 118 in. (5 in. shorter than that of the eight) and a somewhat smaller powerplant, the six sells at a materially lower price, list prices ranging from $875 up. Cylinder dimensions are 3¼ by 4½ in., making the piston displacement 224 cu. in. With the shorter wheelbase the car weight naturally is somewhat smaller, and this, together with a slightly larger rear-axle ratio (4.55 to 1), is said to give the six practically the same low-speed performance as the eight.

The engine was developed from that of the 1931 Special Six model, but its output (at present 80 hp.) has been considerably increased, chiefly by the adoption of the aluminum alloy cylinder head, which permits of a compression ratio of 6.5 to 1 without calling for the use of special fuels, according to the manufacturers.

One reason for the considerably lower price of the six as compared with the eight is a difference in equipment. For instance, while the eight has free wheeling and ride-control shock absorbers, the six is equipped with Bendix vacuum-operated clutch control. The cut-out device for this unit takes the form of a button located on the dash.

The sloping radiator grille, which is chrome-plated on the eights, is lacquered on the six.

A new development for Graham-Paige is the use of a five-point engine mounting, the fifth point being on a frame cross member under the transmission.

As on the eight, the frame on the six is of the banjo-type with outboard springs and rear axles passing through the side channel. The tread of the six is 61 in., the same as that of the eight.

Standard equipment comprises five demountable wire or painted wood wheels with 6.00/17 in. tires. Centrifuse brake drums, kick shackles at the rear of the left-hand front spring, anti-vapor-lock fuel lines from gas tank to fuel pump, lift jack brackets at the extreme rear end of the frame, twin cowl ventilators, airplane-type instruments, adjustable front and rear seats, center control windshield, interior sun visors, bandit-proof inside door locks, coincidental steering and ignition locks with special switch illumination, sound-deadened door and body panels, concealed windshield wipers and hinges are among the special items which are found on the six as well as the eight.

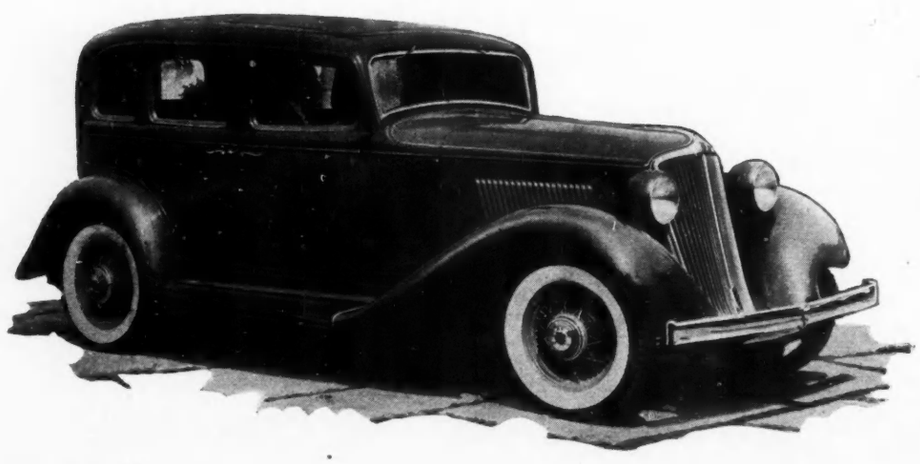
Following are list prices for the new line:

Body Type	F.O.B. List	Delivered List Accessory Group 1	Delivered List Accessory Group 2
2-p. Coupe	$875	$945	$1,010
2-4-p. Coupe	925	995	1,060
5-p. Sedan	925	995	1,060
2-4-p. Convert. Coupe	1,075	1,145	1,210

The standard accessory group No. 1 includes front and rear bumpers, spare tire and tube, metal wheel and tire cover with chrome belt, spare wheel lock and twin horns.

Group No. 2 includes six wheels, tire and tubes with side mounting in fender wells, two tire locks, two metal tire covers, twin horns and bumpers front and rear.

Safety glass throughout is $25 extra on the sedan and $17.50 extra on the coupe; natural wood wheels are $10 extra for five wheels and $12 extra for six.



The new Graham six will be available in four body types of which the 5-pass. sedan is shown at the left. Safety glass in all lights is $25 extra on the sedan shown, which lists at $925

Mallory Combines Vacuum and Speed Control of Spark

A NEW ignition unit, comprising an interrupter, a condenser, a distributor, and a governor, the latter responsive to changes in both the speed and the load of the engine, has been placed on the market by the Mallory Electric Corp., Toledo. Spark governors subject to both speed and inlet-manifold-vacuum control are, of course, no novelty, being standard equipment on a number of 1932 car models, but in the Mallory unit the vacuum control has been combined with the speed control in a particularly neat and simple manner.

It may be advisable to precede the description of the device by a brief discussion of the effect of combined vacuum and speed control on the spark-timing governor. The need for spark advance with an increase in engine speed arises chiefly from the fact that combustion in the engine cylinder is not instantaneous but occupies a certain time, and this time corresponds to a greater angle of crankshaft motion at high than at low speed. If the spark were timed to occur at the proper moment for low speed and this timing were maintained under all conditions, ignition would occur too late for high speed, and that portion of the charge which burns last would then burn too late during the expansion stroke, so that only a very small portion of its heat content would be turned into mechanical energy. On the other hand, if the spark timing were fixed so as to be right for high speed, the spark would occur too early when the engine were running at low speed, with the result that severe knocking would occur. To obviate these various difficulties, the spark timing is varied in accordance with the engine speed, and for best results this is accomplished automatically by means of a centrifugal governor.

However, the speed is not the only factor determining the most desirable spark timing. The rate of combustion of a gaseous mixture varies with the density of that mixture, and combustion in the cylinder therefore is completed in less time when compression in the cylinder is high, as when the engine is running under full throttle, than when compression is low, as when idling. With high compression, therefore, less spark advance is required, and for the smoothest operation of the engine throughout its entire range of both speed and load, the spark timing should be governed not only to increase with the speed, but also to decrease as the load increases.

The advantage of spark control in accordance with engine load is most apparent from the well-known fact that practically all engines detonate when the throttle is suddenly opened for acceleration. Owing to the low speed when acceleration starts, the spark is retarded, but it is not retarded enough for the combination of low speed and high compression. High compression in the cylinders corresponds to low degree of vacuum in the inlet manifold, and spark timing to compensate for load variations is therefore effected by taking advantage of the corresponding variations in inlet manifold vacuum.

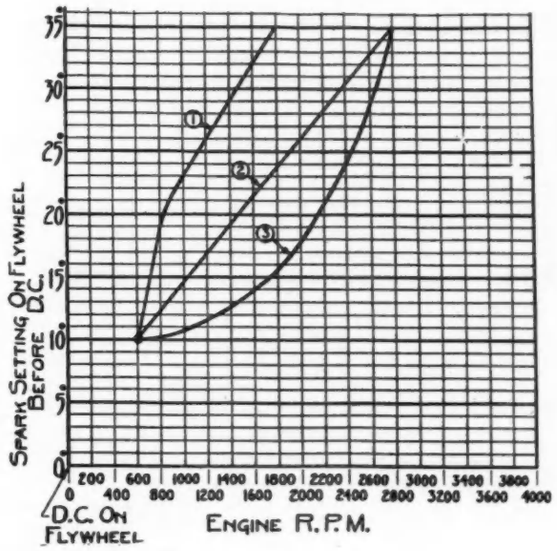


Fig. 1—Spark-advance curve for speed-sensitive governor (2) and limiting advance curves for Mallory governor (1 and 3)

In Fig. 1 line 2 is an advance curve for a conventional spark governor sensitive to engine speed only. The governor becomes effective at 600 r.p.m., at which speed the spark occurs 10 deg. ahead of top dead center. At 1400 r.p.m. the governor had advanced the spark 9 deg. The magnitude of this advance is a compromise, as the advance will be the same whether the engine is operating under full throttle or without load. If the engine were being accelerated under full throttle it would certainly detonate with this advance, whereas if it were idling it would be able to stand a considerably greater advance.

Line 1 in Fig. 1 shows the advance curve obtained with the Mallory governor if the speed of the idling engine is gradually increased from 600 r.p.m., while line 3 is the advance curve obtained if the engine is speeded up from the same minimum of 600 r.p.m. under full throttle. With any given speed the spark advance therefore will be somewhere between the values represented by the points of intersection of lines 1 and 3 with the vertical line for that speed, depending upon the load on the engine.

Sectional views of the Mallory distributor are shown in Figs. 2 and 3. The two governor weights G, which revolve with the distributor shaft, are eccentrically mounted, so that the centrifugal force tends to cause them to turn on their mounting studs. The governor weights carry pins J by which the motion around their mounting studs is communicated to the cam-advance plate H, which latter is rigidly secured to the hollow shaft of cam I.

Most centrifugal governors are provided with a spring which counteract the centrifugal force on the

governor weights and pulls these weights toward the axis of rotation. In the Mallory governor this retracting force is a fractional force and is due to the pressure of the brake shoe F against the circumference of the cam-advance plate H under the influence of spring C and of the vacuum in cylinder B. Brake shoe F is mounted on piston A, which latter is adapted to slide in cylinder B. This cylinder communicates with the inlet manifold of the engine through a tube. Piston A therefore is under the combined influence of the spring C and the vacuum within the cylinder.

Let us first consider what happens if the operator gradually opens the throttle while the engine is idling or disconnected from its load. It naturally speeds up and the greater speed causes the centrifugal weights to move further from the axis of rotation, thereby advancing the spark. But at the same time the vacuum in the inlet manifold is decreased, and the reduced suction in cylinder B enables the spring C to press the brake shoe F harder against the cam-advance plate H, with the result that the increased friction balances the increased centrifugal force and the spark is maintained in a definite, more advanced position.

If when the engine is running at a low speed the throttle is suddenly opened for acceleration, the vacuum in cylinder A is greatly reduced, hence piston A presses brake shoe F more forcibly against cam-advance plate H, and the greater friction thus produced draws the governor weights G closer to the axis of rotation, thereby retarding the spark. Closing the throttle naturally has the opposite effect.

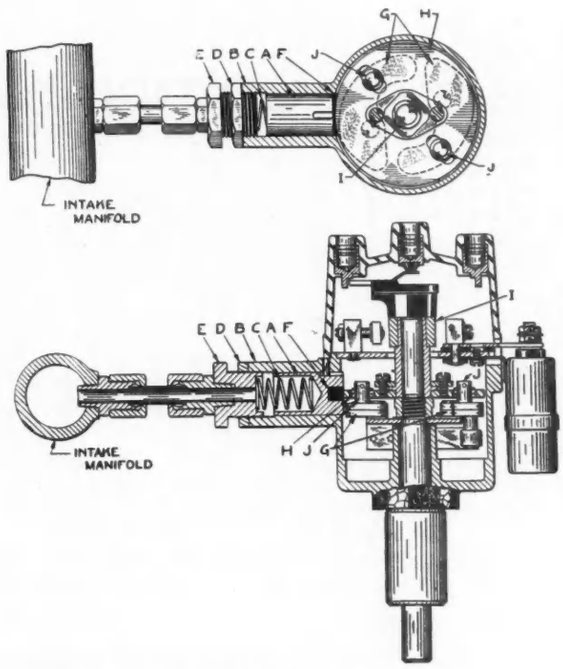


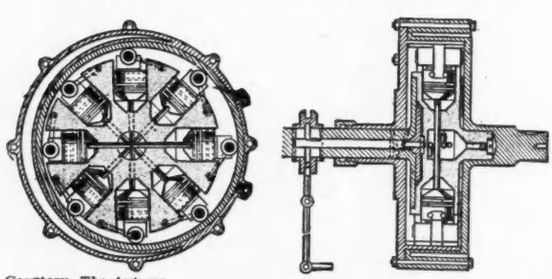
Fig. 2—Horizontal section through Mallory ignition distributor

Fig. 3—Vertical section through Mallory iginition distributor

Paterson Hydraulic Power Transmitter

IN a recent issue of a British contemporary a description is printed of what is known as the Paterson transmitter, an hydraulic device. The transmitter comprises a cylindrical housing in which there is mounted eccentrically a block containing eight radial bores in which pistons are fitted. The block or rotor is driven by the engine and the propeller shaft connects to the housing. Each pair of opposite cylinders is connected together by a radial hole. Each piston carries a roller at its outer end which rolls on the inner surface of the cylindrical housing as the rotor revolves. The entire housing is filled with oil. At the axis of the rotor there is a valve which has as many radial holes drilled through it as there are pairs of pistons, and by means of this valve the communication between opposing cylinders can be shut off either partly or completely.

When communication between opposing cylinders is shut off completely, it is, of course, impossible for the pistons to reciprocate in the cylinders, and hence for the rotor to revolve within the housing, and the transmission of power is then positive. On the other hand, if the valve is set to place opposing cylinders in communication, oil will pass from one cylinder to the opposite one and back again, thus permitting the pistons to reciprocate in the cylinders and the rotor to revolve in the housing. The propeller shaft then, obviously, turns at lower speed than the engine crankshaft, or not at all, depending upon the torque required to move the car and the maximum torque which the engine is capable of developing with the particular throttle setting.



Courtesy, *The Autocar.*

Transverse and longitudinal section of Paterson hydraulic "transmission"

Unfortunately, with a transmission of this type it is impossible to obtain on the driving shaft a greater continuous torque than the maximum torque the engine is capable of developing, and the transmission is not a "torque converter" but an hydraulic clutch. The chief difference in operation between it and an ordinary friction clutch undoubtedly is that if the valve is open it is not easy to stall the engine, because whereas with the ordinary clutch the torque transmitted is independent of the speed, with the hydraulic clutch it varies with the speed, and if the torque required to move the car is greater than the maximum of which the engine is capable at any particular speed, the engine will slow down automatically, which in turn will reduce the drag on the clutch.

That the torque which the device is capable of impressing on the propeller shaft is quite limited is evidenced by an account of a test in which it is stated that there is a distinctly unusual and uncanny feel about driving the car, since the transmission entirely removes any violent acceleration and "hit-in-the-back" feeling that one generally likes to get as evidence that the car has performance.

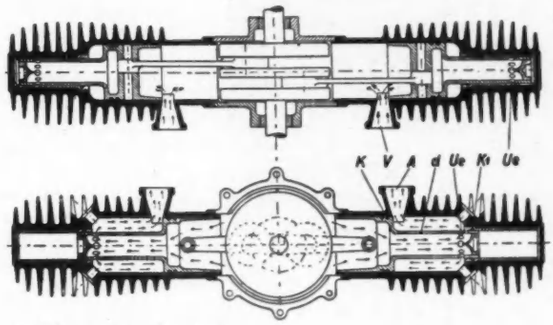
Schliha Two-Cycle Engine Develops 36 hp. at 3200 r.p.m.

A NEW two-cycle, air-cooled aircraft engine for light planes is described in *Die Luftwacht*. The manufacturer is Schliha (Schluepmannsche Industrie-und Handelsgesellschaft m.b.H.), Berlin Oberschoeneweide. Two sectional views of the engine, which has a displacement of only 61 cu. in. and a normal output of 36 hp. at 3200 r.p.m., are shown herewith.

The power piston is provided with a cylindrical extension, the so-called port tube, which controls the transfer of the combustible mixture from the crankcase to the cylinders. The combustion chamber, in consequence, is of annular form. When the pistons are in upper dead center they open the inlet ports *V* and combustible mixture from the carburetor enters the crankcase, where it is compressed during the following piston stroke. Since the mixture fills both the interior of the crankcase and the port tube, it helps to cool these parts. Shortly before the end of the stroke the piston uncovers the exhaust ports *A*, and a little later the transfer ports, in the upper end of the port tube, are uncovered. Fresh mixture then enters the combustion chamber at the upper end and sweeps the spent gases before it, forcing them out of the exhaust ports. The uniflow principle of operation is thus employed.

The engine consists of two silumin (aluminum alloy) castings, each of which comprises one cylinder and half of the crankcase. The cylinder proper is provided with a steel liner, while the extension on the head, in which the port tube slides, has a cast-iron liner. Piston and port tube extension are made of an aluminum alloy titanium, and the port tube, instead of being provided with piston rings on the outside, is rendered air-tight by means of an expanded ring *K*, in the cast-iron liner. It will be seen that the two cylinders are co-axial and the engine, therefore, is completely balanced. The crankshaft is of the (Hirth) built-up type and is fitted with roller bearings throughout.

The engine weighs 79 lb., or only 2.2 lb. per hp.



Schliha Aircraft Engine

Bosch Governor and Pump

(Continued from page 875)

force on the flyweights then becomes great enough to overpower the heavy springs, which are farther compressed, the flyweights move farther from the axis of rotation, the control rod of the pump is moved to reduce the fuel injection, and the speed is definitely limited.

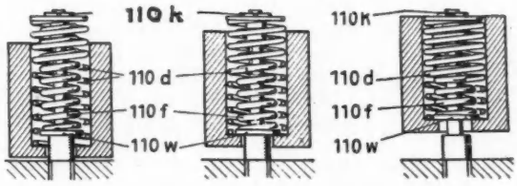


Fig. 3—Showing position of governor weight and spring when idling (left), normal speed (center) and at maximum speed (right)

Second-Half Headaches

(Continued from page 871)

money. They destroy the public's confidence in automobile prices. They tie the dealer's capital up in high-priced used cars at a time when the market is dull and when he needs cash badly to pay running expenses and to get ready for the spring selling season. They put new cars into the hands of owners at a loss, who in the spring could be sold a new model at a profit.

Clean-ups can't be avoided entirely. But there is no excuse for making them a habit, as the industry has done for many years.

If commitments now being made for production in the closing months of the year are tempered with conservatism, there is no reason why 1932 models shouldn't be cleaned up next fall without both factories and dealers losing their shirts.

Gasolines Are Colored For Identification and Sales

GASOLINES are artificially colored not merely to identify them but also for other purposes, state Gustav Egloff, J. C. Morrell and Paul Truesdell in an article in *Gas and Oil Journal*. One other object is to promote sales, for it has been found that the dye improves the appearance of the fuel in the bowls of visible pumps and thus helps to attract business.

When gasoline was produced exclusively by direct distillation from crude oil it was water-white in color, and the impression then formed that this is the natural color of the product and that all good gasoline should have it. Cracked gasoline, which is now the predominant product, generally has a yellow cast, unless great care is exercised in refining it. The cracked gasoline can be rendered water-white by sulphuric acid treatment, but this is expensive.

It was then discovered that the fuel could be dyed in some distinctive hue at far less expense than it could be sulphuric acid treated. The buying public fell in with the idea, and there has been considerable development in the dyeing of motor fuels. Strange as it may seem, a dye does not always impart its own color to the fuel. In some cases a blue dye will give a red or green color when added to cracked gasoline. Some yellow dyes give orange, red or blue when dissolved in benzol, and then give an orange color to cracked gasoline. Some green dyes give yellow or orange when added to a cracked motor fuel. Some black dyes make cracked gasoline gray or brown, while some brown dyes give it a deep red color.

It is also possible to use dyes to make certain gasolines with a light yellow tint water-white. Small quantities of blue dye are used for this purpose, and the principle is similar to that by which sugar is whitened by the addition of small quantities of ultramarine.

The

Forum

Ex-Dealer Would Like to Be "In" Again—But Not Under Present Conditions, Says

Editor, AUTOMOTIVE INDUSTRIES:

Seldom, these days, can one read through a publication devoted to the automobile trade without finding another "squawk" or two about "the terrible used car situation," and the sorry pass it has brought the automobile business to. It's a tragic subject, of course, but it reminds me of a calf bawling because it thinks it is lost, when a few of the herd have just drifted in between it and its mother and it has just realized the situation.

I am an ex-dealer myself, and would like to be again—but not under present conditions. Things look to me like they have about come to the place where to get into the automobile business is to take a sure road to bankruptcy, if you play it the regular way—a hot poker that, after a while, *nobody* will touch. And that's deplorable, especially in view of the fact that it is so unnecessary.

Had occasion yesterday to be talking with the wholesale manager of one of the largest distributors in this city, and I asked him what *he* thought was to be the solution of the used car problem. He replied: "It lies right in the hands of the dealers themselves. It is cooperation—but they won't do it. One or two *always* think they are a little smarter than the rest, and soon they are throat cutting again." And he said it, too. Cooperation among the dealers is a myth. It has been tried since the early days, since there was any used car problem, and only in a few cases has it seemed to work, and then but for short periods. There may be an exception or two to this, but it is obvious that if it would work, it would have *been* worked before now.

Cooperation can't work, because it is "agin' nature"; folks are too greedy for gain. And that's the same reason why the present system has fallen down so flat—and soon perhaps won't even be kicking. No system can work that sets aside and attempts to disregard the fundamental law of supply and demand. Given free play, this law would almost instantly readjust the whole scheme of marketing automobiles, make every dealer a merchant instead of a gambler, and put the new car business on the clean, profitable plane where it ought to be.

But the answer is NOT in the dealer's hands, nor in the hands of the dealers' associations. It is strictly up to the manufacturers—and always has been. And about as obvious as the nose on your face. By practically one stroke of the pen they can wipe out the whole sorry mess. And nobody else can. Why they haven't done it long ago is mystery to me.

Here is a little thing on conditions that I ran into a day or so ago—one of the things that started the train of thoughts that prompted this letter. There is a dealer in one of the larger small towns of southern California. He has been in the business a long time, made money in the old days, but is just sitting tight now, with his service, an occasional sale that still has a little profit in it, and his business property rentals. He said, among other things: "Sure I can run my registrations up—any old time. But I have made money in this business, and I aim to keep it. When I have to go in the red on every deal I make, I'm not making the deal. Other dealers who want that kind of business are welcome to it. But there are plenty of them that have folded up and quit, and there'll be plenty more. Nearly all the leading cars are or have been represented in this town, and I'm telling you that there is not a single dealer here that did not go in the red last year. One dealer (handling one of the best of the high priced lines) has lost an average of $1,000 a month for the last eleven months. No, I'm not taking business unless I make a little on it, and if the distributors want to take my accounts away from me, they are welcome to them. They are not doing me any good."

Yes, it is high time the automobile makers did their stuff, and it's up to *them.*

C. L. JOHNSON,
Los Angeles.

Editor, AUTOMOTIVE INDUSTRIES:

The antidote to overproduction is *limited* production, of course, and in probably no other industry would any attempt to limit production be so certain of failure, or packed so full of dynamite. In what or whom could the power be vested to effectively say to the makers "Thus far and no farther shalt thou go?" By what possible mathematics could the quota for each maker be determined?

In an industry so complex, where keen brains, bold initiative, inventive ability, and creative art are straining their utmost year by year to excite new buying interest, what reward would there be for outstanding successes if the makers were not permitted to produce enough to supply the demand they had created? What a disaster "limited production" would have been to the originators of "floating power" last year!

Not "limited production" but "controlled production" appears to me to be a completely satisfactory answer to the whole production problem—a flexible handling of inventories and manufacturing that expands and contracts with the fluctuations of demand.

However, regardless of whether production is limited or not, the proportion of used car trade-ins to new car sales is nearly the same as the proportion of death to the population—one apiece. It seems to me obvious that the used car situation can not be remedied by simply producing fewer new cars. If this were carried far enough it would only mean that the new car buyer would be made to wait longer for his delivery (at the risk of losing the deal for that make), but when delivery time *did* come, he still has an old car that he expects to, and does, unload onto the dealer. Where is the situation bettered?

No, I have to differ from you, Mr. Shidle. I do not believe that the root of the evil is to be found in overproduction, but I do most emphatically believe that the manufacturers are in complete command of the means to end the intolerable situation if they chose to act.

You are at liberty to publish my letters if you think they might be helpful.

C. L. JOHNSON,
Los Angeles.

Who Invented Rubber-Mounting?

Referring to the article on flexible engine mountings which appeared in our issue of February 6 last, H. McGaffin of New York writes that the original Fergus four-cylinder engine (1915) was entirely insulated from the frame by rubber. At that time it was practically the standard practice to use the engine as a stiffening member for the main frame. Mr. McGaffin would like to know if anyone knows of any earlier use of rubber for this purpose.

Mr. Cox Adds Some Remarks on Strength of Gear Teeth; Another Diagram Shown

The chief criticism of my paper on "New Light on the Strength of Gear Teeth," presented May 13, 1932, at the Spring Meeting of the A.G.M.A. in Cleveland, was that on account of the inevitable inaccuracies of gear manufacture, two pairs of teeth cannot be counted on with certainty to be always simultaneously in contact, and tooth breakage would take place therefore by fatigue of the overloaded tooth.

This criticism certainly is not applicable to ground tooth gears, nor to most herringbone gears, nor even to the coarser pitch spur gears with 0.002 in. base-pitch error. For example, the gears shown in Fig. 8 of the paper have a minimum deflection of more than 0.006 in. with a material stress of 30,000 lb. per sq. in. These gears should therefore withstand with ease the effect of an error of 0.002 in. —and they are standing up in service on some heavy electric locomotives.

In very many cases standard gears can be replaced by integral-contact gears, a single one of whose teeth has at least 90 per cent of the strength of the standard gear tooth it replaces. Besides, there is corrective wear in these gears which tends continuously to reduce errors that cause unequal division of the load between tooth pairs. And besides this, I am able to calculate closely the load division between simultaneously contacting tooth pairs, and to predetermine the effect of a given error on the strength of the teeth, so as to know whether it is possible for a given design of gears to fail by fatigue.

This last named method is also applicable to the determination of the amount and location of the "correction" of cutters to obtain exact uniformity of rotation in a driven gear in spite of tooth deflections. In so far as noise of operation is concerned, it is a matter for serious consideration whether it makes any practical difference at full load and full speed whether the uniformity of rotation of the driven gear is disturbed by a tooth contour error or by an equal tooth contour deflection. A. B. Cox.

When This Correspondent Mentions a Tractor-Trailer Train, He Really Means Train

Editor, AUTOMOTIVE INDUSTRIES:

I was very much interested in the article on Paul G. Bennett's powered-trailer scheme in the May 28 issue of *Automotive Industries.* Insofar as he indicates the desirability of independently powered trailer units, I am with him 100 per cent. The practical possibility of low-priced 1-1½-ton tractors or trucks making regular schedule runs with a string of two, three or more trailer units having a gross weight of nine to twelve tons, or upward, is deserving of careful consideration. This certainly is entirely practical if we have independently powered trailer units.

I wish to submit, however, that a generally more satisfactory and probably more economical arrangement can be had with a battery, motor and generator, designed in such a way that when the auxiliary power is not required the battery can be recharged.

The only connection between tractor and trailer will be a simple switch, and, due to the recharging feature, operation of the trailer can be extended over an indefinite period without attention other than routine battery inspection. Provision for maneuvering the trailer without the tractor to facilitate loading, etc., can be included without appreciable complication of the design.

The design involves no features not already applied and put into practice elsewhere in automotive and electrical design. It will be quickly noted that the advantages of this design over any other are two-fold: (1) the absolute "take-care-of-itself" feature, due to the recharging provision, and (2) the extreme simplicity of the design; to wit: elimination of transmission, clutch, free-wheeling device, and probably the differential and propeller shafts. MARK H. BURCHE.

Morrow Filter

A filtering device for the lubricators used on production machinery has been installed in many plants by the Howard B. Morrow Co., Mishawaka, Ind. The filter element may be installed in single oil cups or lubricators serving two to 10 lines.

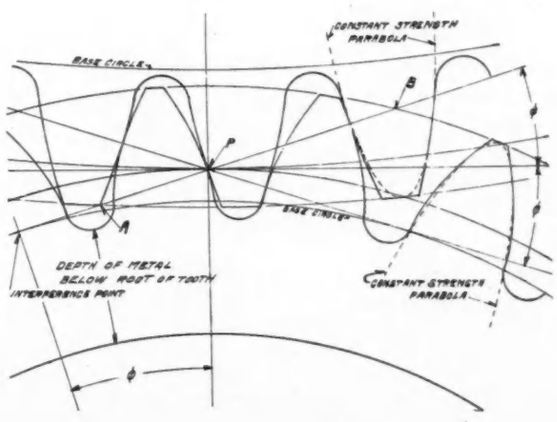
It is claimed that the introduction of the filter into an oil cup does not change the function of the cup as originally built (except to enable it to deliver only filtered oil), nor does it retard the flow, even with the needle valve entirely removed.

A specially impregnated filter felt is used as the filtering medium, through which all the oil in the cup must pass in an upward direction to the inside of a cone, thence out through the exit hole in the cup's central tube to the bearing.

By this construction the filter membrane works in a semi-inverted position, and is so protected from all direct pollution by the coarser and heavier settlings from the oil, which are automatically separated out by gravity and deposited at points away from the filter surface.

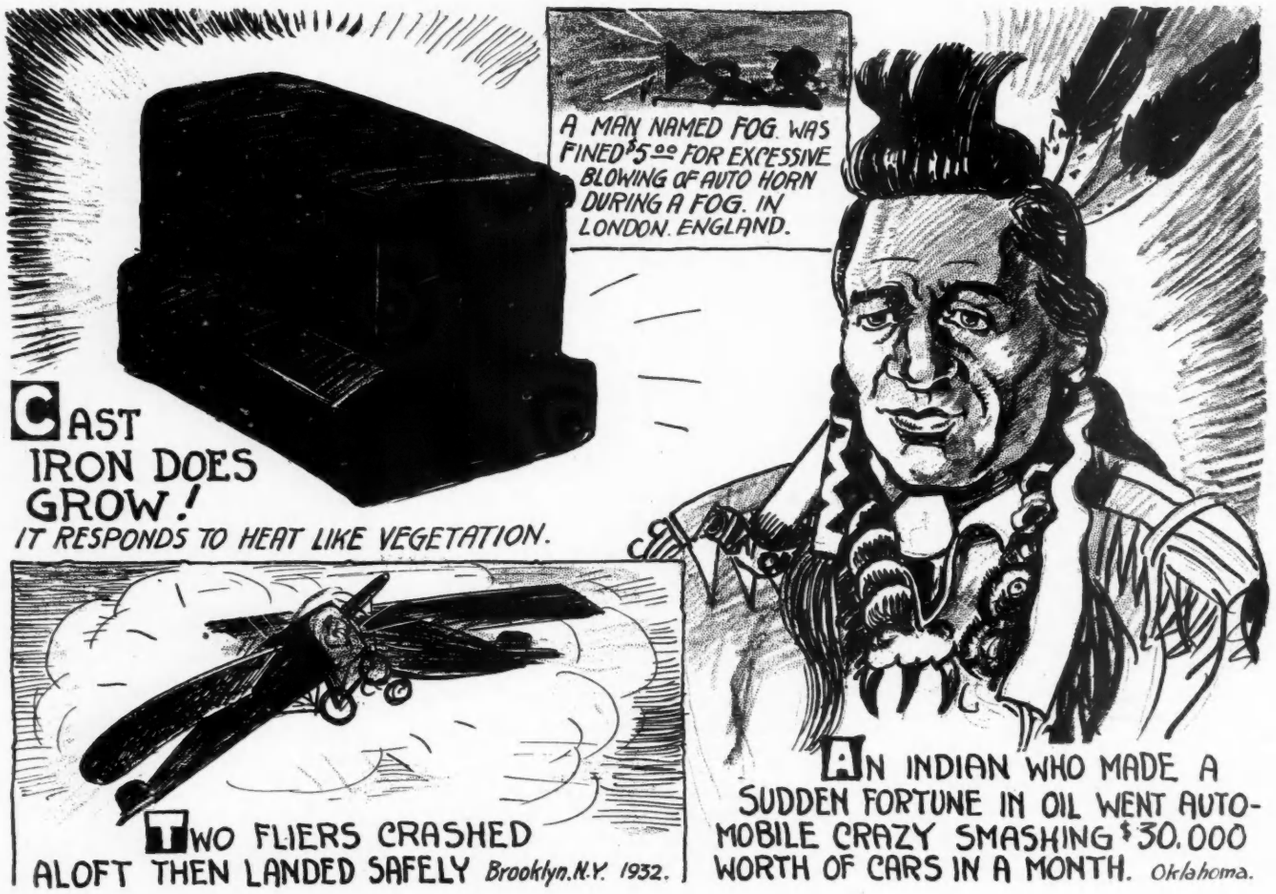
B & S Calipers

Brown & Sharpe Mfg. Co., Providence, R. I., has recently added a line of 1-in. micrometer calipers in several styles having the ends of the spindle and anvil faced with tungsten-carbide. The micrometer calipers so furnished include 16 different styles for measuring in thousandths or ten-thousandths of an inch.



The drawing at the right is the Fig. 8 of Mr. Cox's paper

Automotive Oddities—By Pete Keenan


A MAN NAMED FOG WAS FINED $5.00 FOR EXCESSIVE BLOWING OF AUTO HORN DURING A FOG. IN LONDON, ENGLAND.
CAST IRON DOES GROW!
IT RESPONDS TO HEAT LIKE VEGETATION.
TWO FLIERS CRASHED ALOFT THEN LANDED SAFELY Brooklyn, N.Y. 1932.
AN INDIAN WHO MADE A SUDDEN FORTUNE IN OIL WENT AUTOMOBILE CRAZY SMASHING $30,000 WORTH OF CARS IN A MONTH. Oklahoma.

The News Trailer

Write us if you know an oddity

The late Henry M. Leland did not exactly pick the name for the Lincoln car out of thin air. Settlement of his estate reveals that he was quite a collector of relics associated with the Great Emancipator, and that the hobby was active throughout his life. At the age of 21, in 1864, Mr. Leland had cast his first vote, for Lincoln as president. Now, after 68 years, his collection of Lincolniana was put on the auction block in Chicago, and 171 items of it brought approximately $7,500. Names of the purchasers were not made public.

We got a sudden and churlish chuckle out of a *lapsus* which appeared in an English motoring publication. Speaking of a new gasoline, the publication said that it was distinguished by having an OCTAVE number of 85.

In case no one else reports it, we want to call attention to a sentence in a paper by Herbert G. Winter, consulting engineer, Briggs Mfg. Co., "Application of Aerodynamics to the Present Motor Car," presented to the Summer Meeting of the Society of Automotive Engineers, Inc., etc., etc. Mr. Winter says: "I believe that an engineer, when making a statement of any kind, should add, 'within limits,' 'if all the assumptions are correct,' or 'more or less'." . . . We wish Mr. Winter's ideal engineer all the luck in the world, but we don't think he's going to have much fun.

The town of Haverstraw, N. Y., has been identified as the place where there are more automobiles than bathtubs. These figures may be in error, of course, due to the fact that attempts to register the bathtubs have met with determined resistance from the citizenry.

NEWS

Hoover Signs Bill Amending Tax Law on Undelivered Sales

by L. W. Moffett

WASHINGTON, June 15—President Hoover yesterday signed an amendment to the revenue bill which makes excise taxes applicable on purchases contracted for but not delivered before June 21, when the taxes become operative. The amendment was passed first by the House and then the Senate and was designed to correct an oversight, according to acting-chairman Crisp of the Ways and Means Committee. Mr. Crisp said the amendment will prevent a loss of approximately $50,000,000 which the taxes were originally estimated to raise. The amendment will apply with particular force to automobiles, trucks, parts, accessories, tires, and inner tubes.

The House bill carried a provision that when contracts not specifying who should pay the tax had been drawn before May 1, 1932, for taxable goods not actually delivered before June 21, the taxes should be paid by the buyers. The House agreed to a Senate amendment exempting purchases by "persons, other than dealers" if contracts had been made prior to May 1. Large companies, it was declared, including makers of cars and trucks, tires, etc., would have been permitted through the qualifying term, "persons other than dealers" to escape the tax where long-time contracts had been made. The amendment covers the long-time contracts but instalment purchases continue to remain tax free pending the effective date of the new law.

Meanwhile the Internal Revenue Bureau is hurrying plans for promulgation of regulations covering the various excise taxes. It is expected those on automobiles, tires, etc., will be prepared by the end of next week, though no assurance to this effect could be given.

The Bureau has issued its first two forms for making returns under excise tax provisions and sent them to collectors throughout the country. One set of forms covers the tax on lubricating oil, gasoline and products grouped with them. These forms themselves give a rather clear idea of the character of forthcoming regulations.

The instructions regarding lubricating oils, point out that the tax is 4 cents per gallon, but that it is not applicable to imports. Those regarding gasoline say the tax is imposed on gasoline sold by the importer or by a producer at the rate of 1 cent a gallon except that under the regulations the tax shall not apply in the case of sales to a "producer" of gasoline.

"If a producer or importer uses (otherwise than in the production of gasoline) gasoline sold to him free of tax, or produced or imported by him, such use shall for the purposes of this title be considered a sale," say the instructions.

The term "producer" includes a refiner, a compounder, or blender, and a dealer selling gasoline exclusively to producers of gasoline, as well as a producer. The term "gasoline" means gasoline, benzol and any other liquid the chief use of which is "as a fuel for the propulsion of motor vehicles, motor boats, or airplanes."

It is pointed out the taxes are payable without any assessment by the Commissioner of Revenue or from the collector. They are payable monthly.

Additional information on excise tax developments will be found on page 896 of this issue.

Plan Willys Welcome

TOLEDO, June 14—John N. Willys will be welcomed to Toledo with a civic dinner in the Chamber of Commerce Thursday night at which C. O. Miniger will be toastmaster. Several local groups will voice their appreciation of Mr. Willys' return to active duties as chairman of the board of Willys-Overland.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, June 15—There was a fairly substantial improvement in the retail movement of seasonal goods last week; but wholesale business, for the most part, showed no increase in activity. However, retailers' stocks are at very low levels, and wholesalers and jobbers are preparing for an increased demand. With the exception of winter wheat, the outlook for crop yields is favorable so far.

DEPARTMENT STORE SALES

The Federal Reserve Board's adjusted index of department store sales for May stood at 74, with the 1923-25 average equal to 100, as against 80 for April and 72 for March.

CAR LOADINGS

Railway freight loadings during the week ended May 28 totaled 520,962 cars, which marks an increase of 5512 cars above those during the preceding week, but a decrease of 190,257 cars below those of a year ago and a decrease of 339,102 cars below those two years ago.

BUSINESS PROFITS

Business profits in the first quarter of this year, according to the Federal Reserve Bank of New York, were very small. Total net profits of 293 companies were less than one-fifth as large as those in the corresponding period in 1931 and less than one-tenth as large as those in 1930. The oil group was the only one to show an improvement over last year; a slight net profit was reported this year, as against a deficit last year. Earnings of the food group were fairly well maintained. All other groups showed a substantial decline.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended June 4 amounted to 2,181,250 bbl., as against 2,169,400 bbl. for the preceding week and 2,474,950 bbl. a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended June 11 stood at 59.6, as against 60.2 for both the week and two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended June 8 were 25 per cent below those a year ago.

STOCK MARKET

Following the sharp upward movement during the preceding week, declines were general on the stock market last week. At the beginning of that period, the passage by the House of Representatives of the Garner Relief Bill encouraged liquidation. Strength developed as the week progressed, and prices were irregularly changed for the week. The volume of trading was moderate. The bond market maintained a strong undertone despite the decline in prices, which closed the period under discussion above the level of two weeks ago.

RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended June 8 showed increases of $7,000,000 in holdings of discounted bills and of $70,000,000 in holdings of Government securities. There was practically no change in holdings of bills bought in the open market. The reserve ratio on June 8 was 59.4 per cent, as against 61.4 per cent a week earlier and 63.1 per cent two weeks earlier.

N.A.C.C. Reelects Alvan Macauley

Byron Foy Named Director of Chamber at Meeting

Alvan Macauley, president of the Packard Motor Car Co., was reelected president of the National Automobile Chamber of Commerce at the annual presidents' meeting of the Chamber in New York, June 9. Mr. Macauley has been president of the Chamber for the last three years.

The election of Byron C. Foy, president of the DeSoto Motor Corp., to the Chamber board of directors was also announced.

Other officers of the Chamber who were reelected include: first vice-president, Alfred H. Swayne, vice-president, General Motors Corp.; vice-president (passenger car division), A. R. Erskine, president, Studebaker Corp.; vice-president (commercial car division), A. J. Brosseau, president, Mack Trucks, Inc.; vice-president, Alfred Reeves, New York Office; vice-president, Pyke Johnson, Washington Office; secretary Charles W. Nash, chairman, The Nash Motors Company; treasurer, F. J. Haynes.

Alfred Reeves was reelected general manager as well as vice-president.

In addition to those mentioned above, the other directors of the Chamber are: Roy D. Chapin, chairman of the board, Hudson Motor Car Co.; Walter P. Chrysler, president, Chrysler Corp.; E. L. Cord, president, Auburn Automobile Co.; Robert C. Graham, vice-president, Graham-Paige Motors Corp.; Charles D. Hastings, chairman of the board, Hupp Motor Car Corp.; William E. Metzger, vice-president, Federal Motor Truck Co.; L. A. Miller, president, The Willys-Overland Co.; Alfred P. Sloan, Jr., president, General Motors Corp.; Robert W. Woodruff, chairman of the board, The White Motor Co.

The problems of the motor industry and the general business outlook were discussed by the motor executives.

R. H. Grant, vice-president in charge of sales of the Buick-Olds-Pontiac Sales Co., in his talk on the attitude of the industry's sales managers toward service and advertising problems, discussed the advisability and practicability of manufacturers reducing their color combinations represented in their present lines.

Other speakers at the meeting with their topics include: Roy D. Chapin (Hudson) "What More Can Be Done About the Motor Tax Menace?"; Alfred P. Sloan, Jr. (General Motors) "Three Main Problems of Our Industry and How We Can Help"; Joseph E. Fields (Chrysler Sales Corporation) "My Trip Among the Dealers"; Pyke Johnson (National Automobile Chamber of Commerce) "Conditions and Problems in Washington"; Virgil Jordan (McGraw-Hill Publications) "Interpreting the Latest Moves in Business"; Paul G. Hoffman (Studebaker) "How Best to Reduce Number of Models and Variety of Colors"; James D. Mooney (General Motors Export) "What Is Required to Increase Exports"; and discussion on "Administration of New Excise Tax."

Other prominent executives of the motor industry who attended the meeting are: Alvan Macauley, president (Packard); Wm. J. McAneeny, president (Hudson); Charles D. Hastings, chairman, and DuBois Young, president (Hupmobile); Alfred H. Swayne, vice-president (General Motors); Byron C. Foy, president (DeSoto); G. M. Williams, president (Marmon); Joseph B. Graham, president, and Robert C. Graham, vice-president (Graham-Paige); E. H. McCarty, president (Nash); J. A. Bohannon, president (Peerless); H. H. Franklin, president (Franklin); E. S. Gorrell, president (Stutz); H. T. Ames, president (Duesenberg); L. A. Miller, president (Willys-Overland); Robert P. Page, Jr., president (Autocar); R. J. Corbitt, president (Corbitt); E. J. Bush, vice-president (Diamond T); M. L. Pulcher, president (Federal); Harold R. LeBlond (LeBlond-Schacht); E. M. Sternberg, president (Sterling); T. R. Lippard, president (Stewart); F. H. Tinsley, vice-president (Walker); J. C. Boyers, president (Ward Motor Vehicle), and T. R. Dahl, vice-president (White).

Number of G. M. Stockholders Increases

The total number of General Motors common and preferred stockholders for the second quarter of 1932 was 359,046 compared with 345,194 for the first quarter of 1932 and with 285,655 for the second quarter of 1931.

There were 341,490 holders of common stock and the balance of 17,556 represents holders of preferred stock. These figures compare with 327,871 common stockholders and 17,323 preferred for the first quarter of 1932.

The total number of stockholders of both classes by quarters since 1917 follows:

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1917	1,927	2,525	2,669	2,920
1918	3,918	3,737	3,615	4,739
1919	8,012	12,523	12,358	18,214
1920	24,148	26,136	31,029	36,894
1921	49,035	59,059	65,324	66,837
1922	70,504	72,665	71,331	65,665
1923	67,115	67,417	68,281	68,063
1924	70,009	71,382	69,428	66,097
1925	60,458	60,414	58,118	50,917
1926	54,851	53,097	47,805	50,369
1927	56,520	57,595	57,190	66,209
1928	72,986	70,399	71,682	71,185
1929	105,363	125,165	140,113	198,600
1930	240,483	243,428	249,175	263,528
1931	286,378	285,655	293,714	313,117
1932	345,194	359,046*		

*Preferred stockholders of record April 2, 1932, and common stockholders of record May 14, 1932.

Walter T. Sewell

DETROIT, June 13—Walter T. Sewell, 46 years old, secretary and treasurer of the Sewell Cushion Wheel Co., and its former president for several years, died suddenly Friday night.

U. S. Steel Takes Budd License

The U. S. Steel Corp. has signed a contract with the Edward G. Budd Mfg. Co. through which it has acquired the rights to the Budd system of stainless steel construction, including its shot-welding processes, for the use of its subsidiaries in the construction of ships, bridges and structural elements in buildings.

Kari-Keen, Irving Pay

SIOUX CITY, IOWA, June 15—J. M. Kirkman and I. M. Lyon, receivers for the Kari-Keen Mfg. and Irving Eng. companies, have paid an 18 per cent dividend to creditors, totaling $96,247. The receivers are resisting certain claims and if these are successful another small dividend will be paid later. Physical assets of the companies have been acquired by the Gabriel Co., Cleveland.

Chrysler Names Kaufmann

Harry A. Kaufmann has been appointed director of service for the Chrysler Sales Corp., according to an announcement by J. W. Frazer, general sales manager. Mr. Kaufmann was sales manager for Fargo trucks and since that line was discontinued, has been conducting a special research for the corporation into service and parts merchandising.

DeSoto Up in Wayne

DETROIT, June 14—Factory sales of DeSoto cars to dealers in Wayne County for the first ten days of June were 110 per cent greater than during the corresponding period of May, according to a factory announcement. DeSoto was in fourth place in registrations for the period.

Monthly Report of Motor Vehicle Stocks

WASHINGTON, June 14—The following information, based upon data obtained from the most reliable sources, is supplied by the foreign offices of the Bureau of Foreign and Domestic Commerce. Every care is used in the preparation of the estimates which are made only after careful investigation. "High" means that the supply is considered large in relation to current state of demand. "Normal" is used almost synonymously with "adequate," that is, when the volume on hand is sufficient to supply immediate requirements plus the estimated demand for 1 to 1½ months. "Low" means that the volume on hand is not considered sufficient to supply immediate requirements.

H—High. L—Low. N—Normal. U—Unusually. S—Seasonally. — No information forwarded.

COUNTRY	PASSENGER CARS								TRUCKS AND BUSSES			
	Low Priced		Medium Priced		High Priced		Used Cars		Heavy Capacity		Light Capacity	
	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other
Argentina	N	N	H	H	N	N	N	L	H	N	H	N
Chile	H	H	H	H	H	H	L	L	N	L	H	L
Cuba	N	N	N	—	N	—	N	—	N	—	L	—
Panama	L	—	S-H	—	N	—	N	—	N	—	N	—
Peru	L	N	L	L	L	None	H	N	N	None	N	None
Uruguay	L	U-L	U-L	U-L	None	None	N	N	U-L	U-L	N	U-L
Australia	H	H	H	N	H	N	U-L	U-L	H	N	H	N
British Malaya	L	N	L	N	—	—	H	H	N	N	N	N
Japan	N	H	N	—	N	—	L	—	H	—	S-H	—
N. E. Indies	H	H	N	H	L	—	H	H	H	—	H	N
Philippines	S-H	—	S-H	—	S-H	—	—	—	H	—	L	—
Siam	N	H	L	H	None	None	N	N	H	L	N	N
Czechoslovakia	L	S-H	L	S-H	N	H	L	U-H	N	H	N	S-H
Denmark	N	N	N	N	L	L	N	N	H	N	H	N
France	H	U-H	N	H	N	H	S-H	S-H	None	N	L	L
Germany	L	N	L	N	L	N	H	H	None	N	N	N
Hungary	N	N	H	H	N	H	L	H	N	H	L	H
Netherlands	S-H	N	L	N	L	N	L	L	N	N	N	H
Norway	N	N	L	L	L	L	H	H	L	L	N	L
Poland	N	S-H	N	L	Few	U-L	N	H	L	L	N	H
Portugal	L	H	L	N	U-L	U-L	N	H	L	L	L	H
Spain	L	N	N	U-L	U-L	U-L	L	L	U-L	U-L	N	N
United Kingdom	L	N	N	H	N	H	L	H	—	—	N	N
Gold Coast	N	N	L	L	None	None	N	S-H	N	N	N	N

Packard Retail Sales

DETROIT, June 14—Packard Motor Car Co. has reported that May retail sales showed an actual increase of 7 per cent over May of last year. Deliveries of cars to customers were only 8 per cent below deliveries in May, 1931. The excess of sales over deliveries indicates a good report for June, through a large number of sales on which deliveries were not made in time for May records.

During the first five months of the year Packard registrations fell only 13 per cent below those of the same period last year and with the increasing sales are expected to go higher.

Packard sales executives report that actual shipping orders now on hand are sufficient in number to take care of the entire Twin Six production for a period of nearly two months. New car stocks in the hands of distributors and dealers have further declined during May.

Murray Holders to Vote

DETROIT, June 14—A special meeting of the stockholders of Murray Corp. of America has been called for July 11, to vote on a proposal to convert the present no par common shares to an equal number of shares of $10 par value, reducing the invested capital to $8,089,120 from $22,745,127.

New Lubricant Offered

NEW YORK, June 15—A new lubricant for stationary machinery and automobiles has been placed on the market by the Lubriplate Corp., which has opened an office in the Chrysler Building. It is claimed that in use this lubricant deposits a thin film of zinc on the wearing surfaces. This film is said to be so thin that it cannot interfere with the proper operation of the parts, but to constitute an effective protection against corrosion of the bearing surfaces. This new lubricant, Lubriplate, is said to possess great surface tension, to change its viscosity less than other lubricants with changes in temperature, and, owing to its plating action, not to become contaminated with particles of iron oxide.

S.A.E. Nominations Deferred

At the semi-annual business meeting of the Society of Automotive Engineers, held Tuesday, June 14, during the Summer Meeting of the Society at White Sulphur Springs, W. Va., it was announced that nominations for officers of the Society would not be made public until later in the year.

Reeves on Institute Program

Alfred Reeves, vice-president and general manager of the National Automobile Chamber of Commerce, will deliver an address on Friday, July 8, before the Institute of Public Affairs at the University of Virginia. His topic will be "The Importance of Highway Transportation to Economic Recovery."

Packard Prices Up

The Packard Motor Car Co. has effected price increases as follows: Light 8 series—all types up, $145; Standard 8 series (901)—5-pas. sedan up, $100; Standard 8 series (902)—all types up, $200; Twin six—all types up, $500.

Rubber Consumption Up

Consumption of crude rubber by manufacturers in the United States for the month of May amounted to 29,197 long tons as compared with 25,953 long tons for April, 1932, and represents an increase of 12.5 per cent, according to statistics released by The Rubber Manufacturers Association.

This organization reports imports of crude rubber for the month of May to be 32,224 long tons, a decrease of 12.9 per cent below April, but were 1.6 per cent above May a year ago.

This Association estimates total domestic stocks of crude rubber on hand May 31, at 346,231 long tons, which compares with April 30 stocks of 343,098. May stocks show an increase of 1 per cent above April of this year and 56.8 per cent above the stocks of May 31, 1931.

The participants in the compilation report 50,453 long tons of crude rubber afloat for the United States ports on May 31, which compares with 40,387 long tons afloat on April 30, 1932, and 55,173 long tons afloat on May 31, 1931.

Gilbert and Barker Active in Europe

SPRINGFIELD, MASS., June 14—A revival of European business in its aviation line is reported by Gilbert & Barker Mfg. Co., especially in France, sales being much better abroad than here. More than 200 G. & B. Aeropits have been installed in Europe.

An improved model of the Tru-Meter pump has been put in production. By the end of this month the company's warehouses will be well stocked with pumps and tanks and manufacturing will be sharply curtailed during July and August.

Steel Demand Tapering Down

Ford Buying Continues To Be Important Factor

NEW YORK, June 16—With a tapering off in steel demand, whatever hopes of obtaining better prices for third-quarter shipments producers had entertained have been abandoned. Prevailing quotations for virtually all descriptions of finished steel will continue to apply to third-quarter business. The advance announced several weeks ago by makers of sheet bars and other forms of semi-finished steel and by which it was sought to bring about higher prices in the sheet and strip markets has been annulled.

Opinion is divided as to whether the recession in demand denotes the setting in of the seasonal lull of other years or whether it is merely a temporary check that will be followed by somewhat better inquiry in July. The decrease of nearly 150,000 tons in the leading interest's unfilled tonnage revealed by the monthly statement issued on Saturday is just about one-half the usual shrinkage of the backlog in May and is looked upon as a seasonably normal showing. Ford buying continues to be an important market factor.

Effective July 1, a readjustment of basing points becomes effective in the market for cold-finished steel bars, delivered prices for Detroit and eastern Michigan points outside of Detroit being added. The Pittsburgh base price will remain at 1.70 cents, with that for Buffalo, Cleveland and Chicago at 1.75 cents. The Detroit price will be 1.90 cents and that for the other Michigan points 1.95 cents. This innovation is along the line of the basing system that has been in vogue for some time in the market for hot-rolled steel bars.

Pig Iron—Some fairly representative tonnages continue to be called for by automotive foundries. For outside shipment the quotation in the Cleveland market is $14.50 for both No. 2 foundry and malleable. Valley furnaces quote $14.50 for No. 2 foundry and $15 for malleable with activity very light.

Aluminum—Dull and unchanged.

Copper—The market has turned a shade firmer on reports of more cheerful sentiment in London. Producers quote electrolytic at 5⅜ cents, delivered Connecticut Valley, and 5½ cents, delivered Middle West.

Tin—The governments of the Federated Malay States, Dutch East Indies, Bolivia and Nigeria, constituting the leading tin producing countries of the world, have approved the so-called Byrne plan which provides for cutting down production to a third of that of 1929 and suspension of all exports for two months. Straits tin was quoted at the week's opening at 19.70 cents.

Lead—Quiet and unchanged.

Zinc—Dull and unchanged.

H. L. McClaren

RACINE, WIS., June 13—News has been received here of the death of H. L. McClaren, former Racine automotive industrialist, at his home in Sea Isle City, N. J., on June 6. He was 55 years of age. Born in Pana, Ill., Mr. McClaren started life as a stenographer, but gave up court reporting to join Morgan & Wright, Chicago, pioneer bicycle tire makers, as a salesman. He later managed the San Francisco branch, but returned to Chicago in 1910 to become district sales manager of the United States Tire Co. Two years later he moved to Racine to become sales manager of the Racine Rubber Co., and he became president in 1913. In the following year he also was elected president of the former Mitchell Motor Car Co., serving until 1917. In the same year the Racine Rubber Co. was consolidated with the Ajax Rubber Co. and Mr. McClaren moved to New York to direct the activities as president. In 1919 he left Ajax and organized the McClaren Rubber Co. at Charlotte, N. C. Ajax purchased this business in 1928 and Mr. McClaren returned to Racine to become president, remaining as head of the corporation until the latter part of 1930. For six months he lived in Chicago and then moved East, where he had since lived in retirement.

Milwaukee Ford Plant Near Peak

MILWAUKEE, June 13—With orders running ahead of production, the Milwaukee Ford plant expects to step up production from the present basis of 108 cars and trucks a day to 200. This will mean an increase from 860 persons to approximately 1000 in the payroll. The past peak in employment here stands at 1050. The plant is working eight hours a day, five days a week. The present output numbers 50 V-8's, 50 fours and eight commercial cars a day. The July schedule will probably be 150 eights, 50 fours and eight trucks a day. "We have no fear for the rest of this year," said W. E. Simons, new plant manager who came here recently from Fargo, N. D. "We shall continue to gage production on the basis of sales, and right now we are assured of production until fall before we may have to taper off."

Auto-Lite Declares

TOLEDO, June 14—With the forecast that the Electric Auto-Lite Co. will probably earn a dollar a share on its common stock for the first half, C. O. Miniger, president, announced directors declared a dividend of 30 cents a share on common, payable July 1 to holders of record June 22. The stock formerly was on a dollar quarterly basis. Regular $1.75 preferred dividend payable same date was declared.

Mr. Miniger said no contracts have been lost in three years, and important new ones gained in last 18 months. He said replacement demand for batteries was very good.

Ford Units Set Territory Limits

British and Canadian Groups Agree On Exchange Policy

DETROIT, June 15—Completion of plan reported in *Automotive Industries*, April 30, by which Ford of Canada will produce eight-cylinder cars for all territories not supplied by the American company was announced yesterday by Wallace R. Campbell, president, Ford of Canada, on his return from England. Under the agreement Canadian-made Ford V-8's will be distributed through European and Asiatic territories of the English Ford company and British made 8 hp. Fords will be marketed in export territories of the Canadian Ford company, comprising India, Africa, South Africa, Australia, New Zealand, Malay states and other British territories outside Great Britain.

Between 1500 and 1800 complete Ford V-8's are ordered for shipment during July for distribution in England, Spain, Sweden and other Scandinavian countries to English Ford Co., and between 18,000 and 20,000 Ford V-8 engines to be supplied during next twelve months. In return the Canadian company agreed to take from British Ford approximately 3600 small Ford cars for market in its export territories. For the present, small Fords will not be sold in Canada owing to high cost.

Rules Trackless Trolleys Are Motor Vehicles

MADISON, WIS., June 13—Rubber-tired "trackless trolley" cars are motor vehicles within the meaning of the Wisconsin state motor code and are subject to registration and payment of license fees just as any motor vehicle, according to an opinion by the attorney-general. The opinion was called forth by the operation of trolley buses that have replaced street cars in Kenosha, Wis. Plans are under way in a number of other important cities in Wisconsin to substitute trackless trolley service. Corporations operating the service will have to pay the regular motorbus license fee in addition to the other taxes levied by the state on their property.

Emil Hallman

The death has occurred at St. Michael's Hospital, Toronto, of Emil Hallman, sales manager of the Stewart Truck Corp. of Canada, Ltd., Fort Erie, Ontario, the Canadian subsidiary of the Stewart company of Buffalo, N. Y.

Rubber Companies Busy in Akron

AKRON, OHIO, June 14—Every rubber manufacturing company of the Akron district, including Goodyear, Goodrich, Firestone, General and many smaller plants, is on a seven-day schedule this week for the first time since the depression struck more than two years ago.

Cause of the sudden spurt in the rubber business is the new federal tax on automobile casings and tubes which goes into effect Monday, June 21, manufacturers admit.

Since the tax, ranging from five to 15 per cent, will be assessed against the manufacturers, tire dealers throughout the country have flooded the companies here with orders for tire deliveries before the tax date. Large mail order houses, automobile manufacturers and independent tire dealers have joined in the rush.

Goodyear, Goodrich, Firestone and General worked last Sunday, were going full speed day and night all this week and will work again Sunday.

India Tire & Rubber Co., The Falls Rubber Co., and Seiberling Rubber Co. have been running at full schedule for several weeks. India went on a seven-day week when the tire manufacturers' tax was first proposed.

Firestone was forced to postpone its annual picnic scheduled for June 18 when the plant was to be closed for the day. The outing will be held June 25, four days after the tax goes into effect, company officials announced.

All railroad and trucking facilities out of Akron have been taxed to capacity to carry the unusual load of tires this week. It is estimated that by Monday the stock of tires and tubes on hand in factories here will be almost depleted.

Factory representatives here are divided on their opinions as to the result of the sudden spurt in business. Some fear there will be a big let down in orders immediately after the tax dead line. Others have expressed the hope the buying urge, once started throughout the country, will carry over and reflect improvements in business throughout the summer.

Ex-Cell-O Precision Boring Machine Improved

According to a recent announcement by the Ex-Cell-O Aircraft and Tool Corp., Detroit, Mich., an improved precision boring machine, the style 216A, will replace the style 216 machine which was placed on the market over three years ago. A pedestal foot type of base has been adopted so that no chips, dirt or water can collect around the bottom of the base and be held on the base proper. The overall height of the machine has been reduced 5 in., making the center distance of the individual boring units 42 in. above the floor line. This reduction in height makes it much easier for the operator to load and unload the holding fixture while in production. The overall length of the base has been increased 4 in. and is now 74 in. long. The width, 23 in., remains the same. The hydraulic cylinder operating each boring unit brake is now located on the back end of the spindle bridge directly below the individual brakes. All hydraulic connections for operating the brake cylinder are piped permanently inside the bridge.

The holding fixture is hydraulically operated. The rods are dropped into approximate locating nests and the clamping method is so arranged that the rods are seated against their locating points and against the face of the rod before being clamped in position. Three rods are loaded on one side of the fixture while the three rods on the opposite side are being bored. The loading and clamping operation is easily performed in less time than required for the boring operation.

The production per hour is approximately 350 complete rods. About 0.010 in. to 0.012 in. stock is removed on the diameter.

Employment Rises in Michigan

DETROIT, June 16—Employment in the automobile industry in Michigan during May totaled 140,049 against 136,335 in April and 187,253 in May last year, according to State Department of Labor and Industry based on reports of 52 companies. Aggregate weekly payroll was $3,685,291 in May, $3,282,932 in April and $5,865,896 in May last year.

Average weekly earnings per capita were $26.31 in May, $24.08 in April and $31.49 in May last year.

Aeronautics Branch Issues New Booklet

The aeronautics branch of the Department of Commerce has issued aeronautics Bulletin No. 7-B "School Supplement of Air Commerce Regulations." The bulletin contains portions of the air commerce regulations relating to the conduct of training schools for aviators, as amended May 5, 1932.

Studebaker Truck Sales

SOUTH BEND, IND., June 13—Retail deliveries of Studebaker trucks as reported by dealers for the month of May were larger than for any month since last June, with the exception of September, 1931.

Seven Divisions Report on Standards

Summer Meeting of S.A.E. Gets Recommendations on Many Subjects

(*Continued from page 873*)

cups which are currently listed in the catalogs of supply houses and are not used in automotive equipment. It was further propsed that the S.A.E. recommended practice for carburetor throttle levers, adopted in 1912, be canceled, since throttle levers now are generally designed to meet individual requirements.

A recommendation for rotating air cylinders and adapters (for machine tools) was submitted by the Production Division of the Society, which is one of the sponsors of the Sectional Committee on Small Tools and Machine Tool Elements of the American Standards Association.

Auburn Adds Workers

AUBURN, IND., June 16—With all departments working full six-day-a-week schedules, more than 700 employees have gone back to work in the Auburn plants here in the last two days, officials of the company announced today.

The production program of 12-cylinder Auburns for June has been increased to 600 cars with an equal number of Straight-Eight convertible models. All closed Auburn Straight-Eight cars are built at the Connersville plants of the company.

Marmon to List Additional Stock

The Marmon Motor Car Co. has received permission from the New York Stock Exchange to list 234,800 additional shares of no-par common stock, in order to carry out the provisions of the company's financial reconstruction plan. The stock, which will be admitted on notice of issuance, will bring the total number of Marmon shares authorized for listing, up to 500,000.

Buhl Stockholders File Petition

DETROIT, June 16—Six of the principal stockholders of Buhl Aircraft Co., Marysville, Mich., have filed a petition to dissolve the company.

Equipment Associations Map Plans for Tax Collection

by A. F. Denham

DETROIT, June 14—Recommendations for uniform practice for handling the new two per cent excise taxes on automotive service parts and accessories were adopted, subject to approval by the Treasury Department at Washington, in a joint meeting of the special taxation committees representing the National Standard Parts Association, the National Automotive Parts Association, and the Motor and Equipment Manufacturers Association in Detroit, Monday morning.

A study of these recommendations reveals first of all that manufacturers of parts and accessories recognize that they are in no position to absorb the tax themselves. Profit and loss sheets of manufacturers of such supplies readily bear out this contention. The question then becomes "how can the price of the product be increased to cover the government tax?" An increase in prices or changes in discounts to wholesalers as of June 21, when the tax becomes effective, is a physical impossibility, since such wholesalers already carry similar non-taxed parts in stock, and therefore wholesalers should be selling identical parts at different prices.

Moreover, the necessity of segregating non-taxable from taxable identical merchandise after June 21 on the wholesaler's shelves is a further physical impossibility unless gross profit is increased to take care of this situation. For instance, it would be impossible to mark heat-treated axle shafts with the date of "title-transfer." It would seem to be the logical thing, therefore, to assume that the expense of merchandising all parts from the wholesaler's shelves will be materially increased by the new tax.

The recommendations of the joint committee would seem to meet this problem in good shape. According to these the manufacturer adds two per cent of the money he gets to his invoice to cover the tax. The wholesaler in reselling the part or accessory to the retailer adds two per cent of *his* billing to the invoice, labeled as "tax expense." While the extra amount thus collected by the wholesaler from the retailer will slightly exceed that paid by the wholesaler to the manufacturer, it will hardly cover the additional cost of routine handling of parts from his shelves, and segregation of taxable and non-taxable parts of the identical type. It would seem best, therefore, that the wholesaler add two per cent to his invoices covering *all* parts sold by him after midnight June 20, to cover his costs.

While this has not been recommended by the joint committee of the associations mentioned, the move would seem to be an obviously simple solution of a perplexing problem, and in no way a violation of either the letter or spirit of the tax act.

Especially is this true, when it is considered that at the time this is written, no ruling is available from the Treasury Department as to what constitutes taxable merchandise as of June 21. It is known only that merchandise in the wholesaler or dealer's hands and title for which has also been transferred to the wholesaler or dealer, is not taxable.

Merchandise which hasn't been shipped or delivered to the wholesaler or dealer, on the other hand, is taxable. However, what about merchandise which has been paid for and which has not been received by the wholesaler or dealer, etc.?

It would seem obvious that since the tax is primarily on the manufacturer, being collectible from him, that "manufacture" prior to June 21, should constitute delivery, and provided "title" has been taken by payment to the manufacturer, on the part of wholesaler or dealer, that the article then becomes tax exempt. Articles paid for but not manufactured by midnight of June 21, would on the other hand be taxable. Following are the preamble and recommendations issued in the form of a bulletin by the joint committee of the associations:

Whereas: The burden imposed by the excise Tax Bill upon an already overtaxed industry in addition to the heavy decline in gross margin makes it impracticable for either manufacturer or wholesaler to absorb this 2 per cent excise tax which might well constitute 20 per cent or more of the net profit, and

Whereas: It becomes advisable and expedient for both manufacturers and wholesalers to adopt a plan of application of the tax that is workable and free from complications, therefore, be it recommended

That: All service parts and accessory manufacturers bill the first customer including other manufacturers not exempt under the act, for the amount of the legal tax and that this tax be so indicated on each invoice to such first purchaser.

That: The manufacturers add 2 per cent uniform charge to every invoice covering articles of his own production, using the term "Government Tax." In cases where one manufacturer acquires a portion of his finished articles from another manufacturer, the 2 per cent added to invoices covering same to be designated, "Cost attributed to tax," or some similar phrase.

That: On any parts which might be interchangeable for either taxable or untaxable use under the act, the manufacturer to pay and collect the tax until such time as a specific ruling has been obtained from the Treasury Department.

That: Owing to the extreme difficulty of identifying tax-paid merchandise, it is recommended that, pending definite rulings from the Treasury Department, manufacturers make no tax refunds on returned goods.

That: It be recommended to manufacturers that their prevailing resale schedules or discounts to the trade be unchanged.

That: It be recommended to wholesalers when invoicing taxable merchandise to customers 2 per cent be added to the net amount of invoice for the taxable items, subject to a minimum of 1 per cent for each invoice or sales ticket, and using the designation, "Tax Expenses."

A special joint committee, consisting of T. L. Ford, N. S. P. A.; A. G. Drefs, M. & E. M. A.; and C. E. Hamilton, N. A. P. A., was appointed to confer at the earliest possible date with the Treasury Department at Washington for the purpose of securing approval of above recommended standard policies, and ruling on other questions in regard to the collection of the tax. This committee is scheduled to meet with Treasury officials on June 17.

Boyd Fisher Resigns

Boyd Fisher has resigned as general manager of the National Machine Tool Builders' Association, according to a notice being sent to members of the Association. For the time being, says the announcement, Association business will be carried on from the Cincinnati office under direction of the Board.

Lycoming Schedule Up

WILLIAMSPORT, PA., June 14—Production schedule of the Lycoming Mfg. Co. here has been raised to 3000 straight-eight and 12-cylinder automotive engines monthly, officials of the company announced today. Several departments are now on double shifts.

More than 2000 men have been put to work in the factory here.

Loomis in South

Commercial vehicle operating conditions in Southern States are being studied by Edward F. Loomis, manager of the motor truck department of the National Automobile Chamber of Commerce, who is on a two weeks field tour through that area.

Chevrolet Closes Decatur Office

DECATUR, ILL., June 14—The Decatur zone office of the Chevrolet Motor Co. was closed June 11. The office, managed by O. E. Nonn, had a staff of 20.

Imminent Tax Increases Sales

Motor Vehicle Plants Note Demand Resulting

DETROIT, June 14—With midnight of June 20 as the deadline for shipments to and payments by dealers on new automobiles exempt from the excise tax, automobile factories in a considerable number of cases have noticed increases in dealer orders for immediate shipment, during the past two weeks.

While it is extremely difficult to measure the actual increases in orders at this time, it is doubtful that the effect would be to raise dealer stocks of new cars by more than three per cent. In one or two cases estimates of a five per cent increase in dealer orders have been made, but in the majority of instances orders are only slightly better than normal.

Sales executives in the industry feel that the main limitation imposed on further commitments by dealers is the lack of available cash with which to finance the purchases, since such cars have to be actually paid for by June 21 to avoid the excise tax.

In two cases at least the situation has resulted in production schedule changes. DeSoto-Plymouth on Monday operated both lines at capacity on a 10-hr. day basis. Buick recalled employees to work in several departments several days ahead of schedule for the same reason—to complete shipments to dealers in time.

It is reported also that factories have placed orders for immediate deliveries on some original equipment parts affected by the new taxes, in excess of normal shipment orders.

In the high priced passenger car field there seems to have been less influence on passenger car dealers to place orders at this time for shipment. Where such orders have increased, they have largely been on models and types which dealers already felt reasonably certain they could sell in a reasonable period of time.

White Adds Tractor Type

The White Co. has announced a new super-heavy duty tractor known as the Model 691, for heavy-duty transport hauling.

It has been designed to meet the 40 ft. maximum allowance in certain states and makes possible the use in general operation of longer trailers and bodies without increasing the overall combination vehicle length.

The engine is the White 5-AD, 4⅝ x 5¾, six-cylinder, with a displacement of 580 cu. in. This engine is of the overhead valve type, similar in general design to the series of overhead valve engines manufactured by the White Motor Company during the last five or six years. The engine has a seven-bearing counter-weighted crankshaft, with special aluminum alloy pistons, and pressure and metered lubrication to every moving part. Special attention has been given to accessibility and a double unit 100 per cent oil filter with metallic filtering elements is an integral part of the engine design. A mechanical fuel pump is driven directly from engine, as is the mechanical governor. The air compressor is mounted at the front of engine and driven directly through a splined connection from end of crankshaft. The exhaust valve seats are of the inserted type. The engine is governed at 2050 r.p.m.

N.A.C.C. Directors Issue Statement to Rails

Approving the viewpoint of the traffic group on rate regulation, the directors of the National Automobile Chamber of Commerce, at their meeting June 8, adopted a resolution declaring:

> "That the National Automobile Chamber of Commerce is opposed to the extension of Federal rate-making powers over intercoastal, coastwise and inland water-borne traffic and trucking as unsound and unnecessary and favors a liberal attitude towards rail carriers in regulatory matters, including every reasonable opportunity to meet competition."

The traffic managers of the industry, one of the largest users of all forms of transportation including rail, water and motor trucks, are opposed to bills now before Congress that would regulate water rates through the Shipping Board.

"While the Shipping Board and some of the intercoastal lines," said J. S. Marvin, Chairman of the Traffic Managers' Conference, "have favored such legislation, some of which would extend also to coastwise and inland water traffic, it would be an entirely new departure with respect to water rates. There is a strong feeling against creating additional regulatory bureaus and an equally strong feeling that the lines should be able to handle any differences through their own conferences. On the other hand, the proper sphere of all transportation can be determined better if railroads have every reasonable opportunity to compete with, but not restrict, the other facilities.

"We have been glad to note that more recently the Interstate Commerce Commission has permitted experimental rate-making by the railroads. Regulation is founded in the first instance on monopoly, and where competition has developed, it has seemed proper to permit a certain measure of flexibility in the rail rate structure which in the main has become rather straitjacketed on a mileage basis.

"Our factories have been disposed to give the railroads every opportunity to handle their shipments. Many rates have been approved by the Commission for the purpose of meeting competition, which were departures from the main rate structure.

"It is not likely that the public will ever be denied the benefit of improvements that have been developed in natural methods of deliveries. Certain services are now being obtained by the public without recourse to the railroads, but the latter can well be given the opportunity without undue restriction, to perform any service they feel can be rendered at costs attractive to the shipper and profitable to themselves. It seems doubtful if many of these services will ever return to the rails which, on the other hand, will retain their advantages with respect to long haul and freight in larger bulk.

"There has been a transition in transportation and a deluge of discussion of its effect on the railroads. Some of it seems aimed to have the public believe that the railroads' financial difficulties are due to this 'new competition.' On the other hand, a considerable part of the freight they have lost had been termed, in better times, 'non-remunerative.' The line haul earnings are low and the terminal expenses are high. It will probably require a return of better times with more normal activity in manufacturing, mining and agriculture to get a clear picture; net earnings from the tonnage then handled will disclose the actual conditions."

Ford Men Transferred

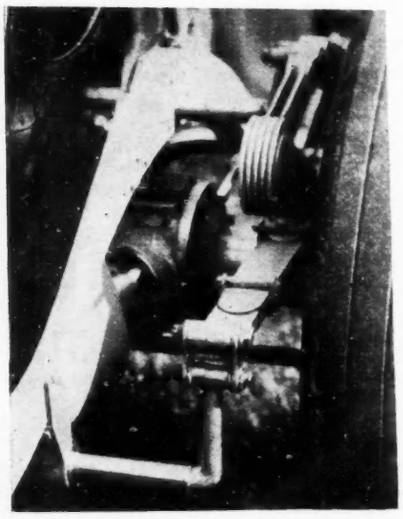
Following its usual policy respecting personnel matter, the Ford Motor Co. has refused to either confirm or deny that a wholesale shifting of Ford branch managers has taken place. Positive information available records the transfer of W. W. Mitchell, manager of the Chester assembly plant for many years, to the Cleveland plant. A. B. Pease, formerly in charge of the Cleveland plant, has been transferred to the Boston area. Several other transfers have taken place, it is believed.

Jobber Groups to Meet

National expression on matters affecting the automotive jobbing industry will be given next week in Chicago, when representatives appointed by 17 regional groups affiliated with the Motor and Equipment Wholesalers Association, along with other M.E.W.A. members and others cooperating with the Association, will hold their first annual summer conference at the Edgewater Beach Hotel, from June 20 to 24, inclusive.

Nuvolari Wins Italian Grand Prix With Average Speed of 104.1 m.p.h.

PARIS, June 6 *(by mail)*—Handling a new straight eight twin-drive Alfa Romeo, Tazio Nuvolari won the Italian Grand Prix 5-hour race with a distance of 520.5 miles (average 104.1 miles per hour). Fagioli, on a 16-cylinder two-crankshaft Maserati, came in second with 515.6 miles, after breaking the track record at 112.07 miles. Borzacchini was third and Campari fourth, both on Alfa Romeos.



Suspension and final drive on Alfa Romeo dual drive racing car

Dreyfus and Divo, each on a Bugatti, followed.

The feature of this race was the first appearance of two new Alfa Romeo single seaters having dual drive. These cars, one of which was driven by Nuvolari and the other by Campari, were built to the designs of Engineer Jano, and have a separate drive to each rear wheel by diagonally mounted inclosed propeller shafts. Immediately behind the four-speed transmission, there is an aluminum housing containing a differential and two pairs of spiral bevel gears. There is a further gear reduction, by means of a pair of spiral bevels in a housing at each extremity of the tubular axle. The driver is seated low between the two propeller shafts, with the tubular axle directly behind him.

The engine is also new, being a straight eight of 65 by 100 mm. (2.55 by 3.93 in.) bore and stroke having aluminum alloy cylinders in two blocks of four. There are two valves in the head, which is not detachable, operating direct on the aluminum casting. Pressed-in steel liners are fitted in the cylinders. A two-piece crankshaft with ten plain bearings, is made use of. There are two pinions on the center of the crankshaft, one of these driving the superchargers, and the other, by means of intermediate gears, the two overhead camshafts. The timing gears are between the two blocks of cylinders, which are bolted together to form one unit.

On the left-hand side there are two Rootes type superchargers, placed longitudinally, one being ahead of and the other to the rear of a pinion taking its drive from the crankshaft. Each supercharger has its own carburetor. On the opposite side there is a water pump, two oil pumps and a magneto in line, driven from a central crankshaft pinion. Oil pipes are mounted on the right-hand frame member and connect to a tank behind the driver's seat. To assist in cooling, the oil return pipe is divided into three horizontal branches on the chassis side rail. Steering is mounted centrally, behind the engine, on the top of the clutch housing.

The engine develops 200 hp. at 5400 r.p.m. Weight of the complete car is only 1540 pounds, with a wheelbase of 102 inches and a track of 53 inches. The new cars created an excellent impression and are believed to have a maximum speed of rather more than 150 miles per hour.

The average attained in this race is exactly that of Indianapolis, on a track measuring 6.2 miles around, but having several curves and two right angle bends, a short distance apart, calling for the use of all four gears.

Canadian Manufacturers Draw Conference Brief

TORONTO, June 14—The brief of the automobile manufacturers of Canada for the guidance of the Canadian Government at the Imperial Economic Conference opening July 21 at Ottawa has been prepared by a sub-committee representing the industry in Canada, composed of Eden Musselman of the Ford Motor Co. of Canada, Ltd.; James Fraser, representing the Chrysler Corp. of Canada, Ltd., and R. W. Baldwin of Graham-Paige (Canada), Ltd. A similar survey has been compiled by representatives of manufacturers of parts, accessories and supplies.

These reports have been forwarded to R. W. Breadner, Commissioner of Customs, Department of National Revenue, Ottawa, who has been appointed chairman of the Committee on Tariffs for the Imperial Conference programme.

Orders Big Truck

CLINTONVILLE, WIS., June 13—A 15-ton 6-wheel drive truck has been ordered from the Four Wheel Drive Auto Co. here by the Iraq Petroleum Co. for use in constructing a pipe line across three nations in the Near East, it is announced. This is the largest model manufactured by FWD and is powered with a 125-hp. engine through a 4-speed transmission with a dual range sub-transmission giving the truck eight forward and two reverse speeds. It is equipped with a cab and a steel body 18 ft. long and 8 ft. wide.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

Bordeaux, Fair .....June
Cork, Commercial .....June
Inverness, Commercial.....June 21-24
Southampton, Commercial .....July 5- 9
Llandrindod, Wales, Commercial July 20-22
London, Olympia Show.....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19

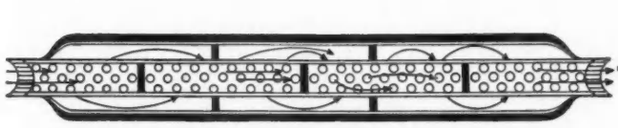
CONVENTIONS

Associated Business Papers, Shawnee-on-Delaware .....June 18-19
Motor & Equipment Wholesalers Assn., Chicago .....June 20-24
American Society for Testing Materials, Atlantic City (Annual Meeting) .....June 20-24
Amer. Soc. Mechanical Engineers, Bigwin, Canada (Semi-Annual Meeting) .....June 27-30
Natl. Association of Taxicab Owners, Chicago .....July 7- 8
Natl. Team & Motor Truck Owners Assoc., Chicago (Annual) .....July 17-19
National Team & Motor Truck Owners Assn., Detroit ....July 17-19
American Chemical Society, Denver, Colo. .....Aug. 22-26
S.A.E. Aircraft Meeting, Cleveland .....Aug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, O. (Machine shop practice meeting) .....Sept. 12-17
American Trade Association Executives, Atlantic City (Annual) .....Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa. .....Sept. 19-20
Natl. Assoc. of Motor Bus Operators, Chicago .....Sept. 22-23
American Electric Railway Assn., Chicago, Ill. .....Sept. 22-23
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, Texas .....Sept. 30-Oct. 1
Amer. Society for Steel Treating, Buffalo .....Oct. 3
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y. .....Oct. 3-6
National Safety Council, Washington, D. C. .....Oct. 3- 7
American Welding Society, Buffalo, N. Y. .....Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting)....Oct. 3- 8
S. A. E., Annual Transportation Meeting, Toronto .....Oct. 4- 6
American Gas Association, Atlantic City (Annual).....Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J. .....Oct. 17-22
American Society Mechanical Engineers, New York City (Annual Meeting) .....Dec. 5- 9
Natl. Exposition of Power & Mechanical Engineering, New York .....Dec. 5-10

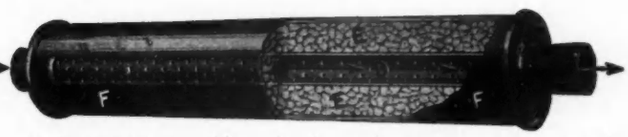
RACES

Roby, Ind. .....June 19
Altoona .....Sept. 5

Here's the Difference—
between
BAFFLE MUFFLERS AND BURGESS MUFFLERS

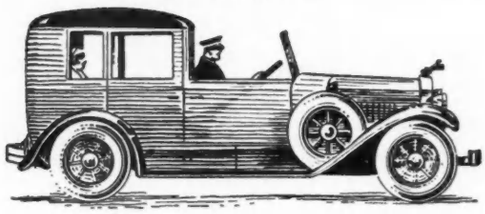


The in-and-out or back-and-forth paths through restricting baffles retard the flow of the burned out gases from the cylinders.



With BURGESS mufflers the burned-out gases pass straight through the muffler as easily as through a straight tube. There are no baffles to set up restriction. Noise is silenced by the patented, acoustical construction of this muffler.

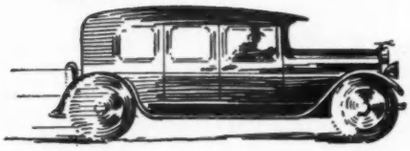
SLOW — The restrictions in baffle mufflers cut down the efficiency of the engine. That is why users of baffle mufflers often resort to noisy cut-outs to get full power from the engine.



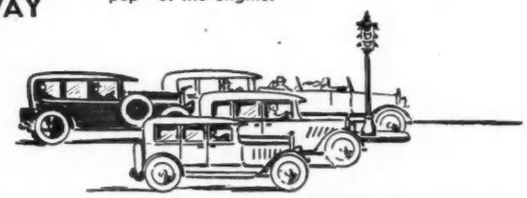
SPEEDY — The BURGESS "straight-thru" construction eliminates all waste of power in the muffler. Increases of top speed of several miles per hour have been obtained by many leading car manufacturers with the BURGESS muffler.

MORE NOISE — With silencing largely dependent on the restricting effect of baffles, automotive engineers are limited in the amount of silencing they can accomplish.

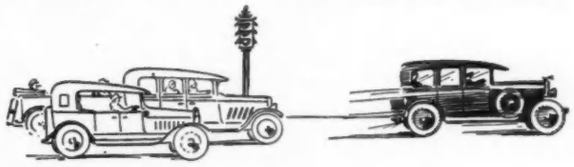
LESS NOISE — With the BURGESS acoustical construction, sound is controlled without any effect on back pressures. This permits far greater silencing than was previously possible—one reason why most of the high-priced cars insist on BURGESS.



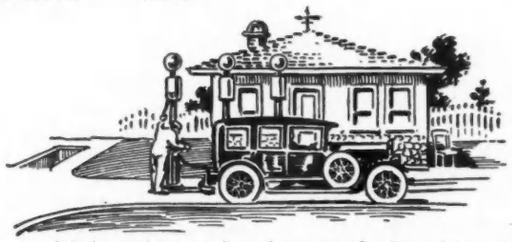
SLUGGISH GETAWAY — The loss of power at all speeds cuts down the "pep" of the engine.



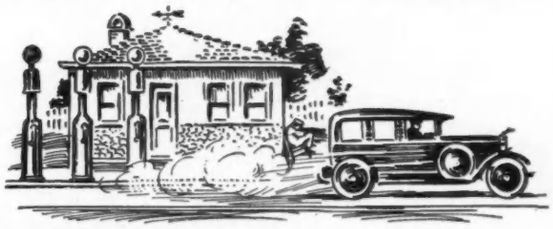
FAST GETAWAY — The horse power saved by the BURGESS muffler insures instantaneous action when you step on the accelerator (7 h. p. additional is not at all uncommon).



MORE GASOLINE — Wasted power not used to drive your car uses up just as much gasoline as if it were propelling vehicle.



LESS GASOLINE — The elimination of wasted power saves gas—more miles per gallon when BURGESS mufflers are used.



We have the records and reports of unbiased investigators to substantiate all of the above claims. Ask us for the proofs.

BURGESS BATTERY COMPANY INC.

ACOUSTIC DIVISION · MADISON, WIS.

DETROIT ADDRESS: 542 NEW CENTER BUILDING

ENGINEERS AND MANUFACTURERS OF ELECTRIC AND ACOUSTIC PRODUCTS

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Footburt 5-Way Drilling Machine

The Foote-Burt Co., Cleveland, Ohio, has just shipped a special 5-way multiple spindle drilling machine that incorporates their latest developments in way drilling equipment. It has a total of 90 spindles and was furnished for drilling a V-type cylinder block. As will be seen from the photograph, the machine has one vertical head, two upper angular heads and two lower angular heads. It is of unit type construction, each drilling unit being complete within itself with individual motor drive. The frame of the machine is constructed of heavy castings to give it rigidity and furnish a solid support for the fixture and drilling units.

The heads are driven by the latest drum type cam units, the vertical unit and two upper angular units having 14 in. diameter cams and the two lower angular units having 10 in. diameter cams. In designing this machine the most suitable size of cam unit was used on each way; due to the small number of spindles on the lower angular heads, it was possible to use a smaller unit than was necessary for the upper angular and vertical heads. The ways for these units are extra wide and the slides long to provide the necessary support. All units are driven by standard foot-mounted ball bearing motors so that the motors may be interchangeable whether they are used on vertical, horizontal or angular ways. All heads and cam units have individual lubricating systems with sight feed gage to show the level of oil in the unit.

The work of the operator is extremely simple; one throw-in lever operates all drilling units. One fixture clamping lever clamps and locates the part and also moves the guide bushings in close to the work with a single operation. The throw-in lever starts the cycle of all units simultaneously and each unit continues through its cycle, returning to the starting point and remaining until the machine is unloaded and the throw-in lever is again operated. Each head is individually adjustable on the ways to compensate for drill grinding, adjustment being by means of a crank which is used on squared shafts.

Lovejoy Milling Cutter

A new form of side milling cutter, developed by the Lovejoy Tool Co., Springfield, Vt., for use where side space is limited, is made either right hand or left hand, and embodies their original positively locking blade mechanism. It has a blade adjustment

of approximately one-half the total length of the blade to compensate for wear and grinding.

Blades used in this cutter also embody their very latest development in blade shape. This cutter not only uses standard or cobalt high speed steel blades, but is ideal for Stellite or Stellite "J" Metal, or tungsten-carbide tipped blades. The bodies or housings are made from heat-treated alloy steel.

Lock Washer and Cap

A combination lock washer and metal cap which completely conceals and seals a bolt or screw head, or nut, has been placed on the market by the Rawlplug Co., Inc., of New York. It is known as the Lok-Crowner. The lock washer is made of spring steel and has a four-point locking arrangement; it is cup-shaped, with projecting prongs which engage and securely hold the decorative cap. Caps are made either of drawn metal, plain or decorated, or of molded bakelite, the latter being used where it is desirable to insulate the bolts. The lock washer section is applied in the same manner as an ordinary washer and the screw or nut drawn tight. The cap is picked up by a special applying tool, a spring arrangement of which holds the cap in position to be placed over the washer section. A few taps of the hammer on the top of the tool drives the cap down over the projecting prongs of the washer which digs into the softer metal and holds the cap firmly in place.

(Turn to page 902, please)

THIS MAKES IT A BETTER TRUCK TIRE RIM

The man who changes tires likes K rims because he knows that the base and the tire can't stick together—he can get the tire off without back-breaking work.

Here you see the reason. A transverse slit in the base—used in all Goodyear Type K Rims, with a continuous, locked-on ring for safety.

Open-end valve slot protects valves, saves time and work in handling tubes.

That's a successful combination of features for any tire size—from one-ton to five-ton truck.

For full facts, write to Rim Department, The Goodyear Tire & Rubber Company, Inc., Akron, Ohio.

TUNE IN:

Goodyear invites you to hear the Revelers Quartet, Goodyear Concert-Dance Orchestra and a feature guest artist every Wednesday night, over N.B.C. Red Network, WEAF and Associated Stations

"THE MAN WHO CHANGES THE TIRES LIKES K RIMS"

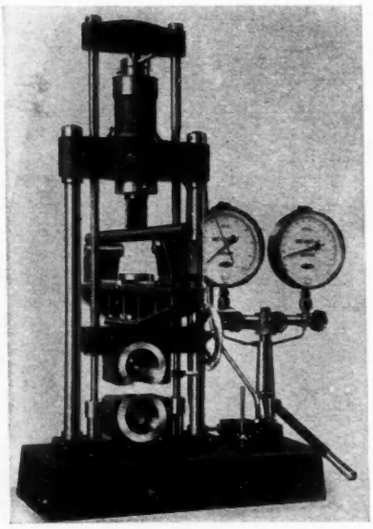
GOODYEAR

K-28 RIMS K-18

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Steel City Testing Machine

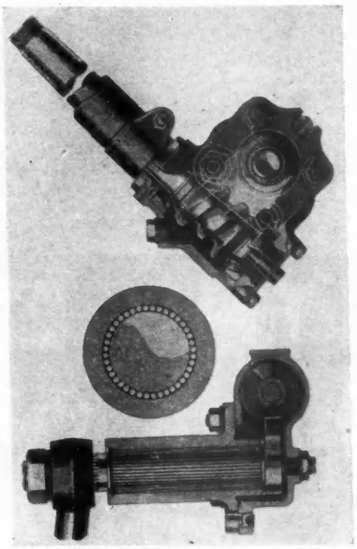
A new testing machine, Model MP-10, has been placed on the market by the Steel City Testing Laboratory, Detroit, for testing specimens in tension, transverse, bending and compression. This machine is being built for foundries, sheet-metal, wire, cable, welding plants and technical schools, as well as many other plants where a machine of low capacity (22,000 lb.) will suffice.



Outstanding features of this moderately-priced apparatus are finely fitted non-packed plunger, vertical adjustability of the upper pulling head, two measuring ranges, versatile applicability, ease of operation, space saving, convenient working height and accuracy. The machine can be supplied for hand or motor drive.

Thermo-Tel Electric Temperature Signal

A temperature signal device for determining temperature by means of electric lights, known as the Thermo-Tel, has been developed by the Uehling Instrument Co., Paterson, N. J. The instrument consists of different colored electric lights, actuated by changes in temperature. When the temperature is within the limits for which the instrument is set, a white light will illuminate; when the temperature is above the limits, a red light will illuminate, and when the temperature is below the limits, all lights will be out. If desired, the signaling lights may be located at any distance from the work which is being observed. Thermo-Tel Temperature Signals are said to be accurate to within less than 1/10 of 1 deg. Fahr., and can be read at a distance of about 200 ft.



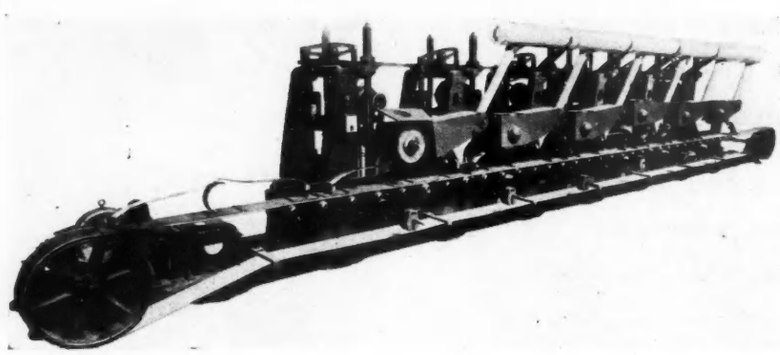
Sectional views of Gemmer steering gear with roller-bearing cross-shaft

New Gemmer Gear for Super-Balloons

A new steering gear specially designed for use on cars equipped with super-balloon or doughnut tires has been brought out by the Gemmer Mfg. Co. of Detroit. These large tires naturally tend to make it more difficult to operate the steering gear, owing to their larger surface of contact with the ground, and to counteract this effect the new Gemmer steering gear is provided with flexible, small-diameter steel rollers on the cross-shaft, which take the place of the usual bronze bushing. Tests are said to have proved the friction-reducing qualities of the new cross-shaft mounting, and it is being used on both types of Gemmer designed steering gear, the sector type and also the worm-and-roller type.

Excelsior Straight Line Bumper Polisher, No. 29

Following the latest trends in design, the Excelsior Tool & Machine Co., East St. Louis, Mo., has redesigned their well-known straight-line polishing machine to accommodate the new bumpers. The six-wheel machine shown will take the wide, oval or corrugated face bars. It is also designed for the higher lift necessary with the deeply curved bumpers.



The new machine permits a 12-in. wheel rise. Heads are spaced wider apart and are much heavier. The dust-suction system has been improved and its capacity increased. It is made up of independent, interchangeable units permitting the building up of a machine of any desired size. For example, a 14-wheel machine can produce from 1000 to 2000 bars a day, depending upon the size and shape of the work.

Each unit is powered by a 10 hp. motor driving the spindle by grooved pulleys and six V-belts. Heavy balance weights are employed to prevent the wheels from bouncing due to steep drops. The belt conveyor is driven by the Reeves adjustable speed regulator. The six-wheel machine requires a floor space of 6 x 48 ft. Weight is about 25,000 lb.